The Influence of Blended Learning Technology on Contemporary Society

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Abstract

This study comprised of two groups of subjects, a pre-study and a main-study. The pre-study consisted of a large group of elementary English learners at a medium-sized private university in Japan, while the main-study consisted of a much smaller group of intermediate level English language learners at the same university. The pre-study group comprised of 480 subjects ranging in age of 19 to 21 while the main-study group contained 7 students all aged 20. Both groups were introduced to various levels of digital, online learning tools that were specifically chosen for the tasks at hand and to meet course objectives. The primary objective of this study is to raise awareness of technology through various blended learning components that aid autonomous learning, providing students with new learning skills and ultimately a new mind-set. It was predicted that the introduction and on-going support of new learning tools could not only motivate learners to learn more but also improve test-scores over a comparatively short period of time. The pre-study group was divided into two subgroups, the A group and the B group. The A group had more exposure to computers than the B group and were expected to show higher gains. A considerable volume of data was collected from the pre-study ranging in quantitative and qualitative results obtained through a before and after survey. The main-study had similar class objectives however, technology used was slightly more advanced than the pre-study and needed more intensive tuition. Results for this part of the thesis were also positive.

There is a plentiful supply of literature on the values and attributes that innovative techniques can bring the learner. However, very little of this prose provides conclusive evidence to indicate that technology can in fact improve results. This was the first of three gaps identified in the literature review for this thesis. The second gap refers to the lack of data in regards to the precise digital tools that were used. There is very little literature in this field as digital flashcards are relatively new. The third and final gap in the research involves the use of technology in professional development. This thesis also aims to reassure researchers of the importance of teacher support and guidance especially when complementing course design with technological tools.

Through appropriate forms of online learning tools this study will confirm that technology can benefit students at the micro-level and ultimately at the macro-level of course design. The implications of this are vast. If a blended learning course like this one is designed and implemented accordingly, students can become more independent in their learning which in turn can influence their learning at the micro-level in class, the meso-level at university and potentially the macro-level in society. Empirical data will be introduced to suggest that test scores, ability and awareness can be improved after the introduction of a blended learning component. The data obtained in this study, along with positive test score results will illustrate that technology can and does help if implemented in the correct manner.

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Chapter 1 – Introduction

1.1 Technology in Education

Technology has shaped the students that we teach in recent times. Learners of today seem to be surrounded by and constantly immersed in technology. Tapscott refers to the young of today as the `N*et Generation'* (1999). Prensky claims that today`s students are no longer the people our educational system was designed to teach, (2001) and that 'Digital Natives' learn in ways that were never previously possible (2010). Instant access to information, in the form of high speed internet, Wi-Fi and more recently the introduction of smart-phone technology means that information and learning through such sources is more viable now than ever before. Such developments in technology can be seen to have considerable implications for education, in relation to the growing need to prepare young people for a life saturated by technology and rapid change. Technology transforms knowledge, and makes new things possible in alternative ways.

The relatively recent introduction of smartphone technology has seen exponential growth over the years. Smartphone technologies have the potential to provide a long list of new and exciting learning experiences to the learner (Kim et al, 2013). It is about time that teachers embrace the use of such technology in class through the introduction of innovative applications and programmes that have the power to encourage autonomous learning in all levels of students.

The use of technologies in all shapes and forms continues to gain interest in education as schools, universities and educators around the world improve their facilities in line with modern technological advancements. Whether to enhance learning, to compete for students or to improve educational standards there is no denying that the tendency in modern day institutions is to adopt technology as much as possible. The topic has garnered huge interest in the field of education, as with the

power of technology, learning is now no longer confined to the constraints of the classroom. Technology in education is the first of three main themes that this thesis focuses on.

1.2 Blended Learning

The second theme is “blended learning” which stems from the immersion of technology in education. Blended learning refers to the blending of traditional face-to-face classroom instruction with online technology which inspires learners to continue their learning online.

Blended learning is a term increasingly used to describe the way e-learning or electronic learning through a computer medium, is being combined with traditional classroom methods and independent study to create a new, hybrid methodology. This new style of teaching moves the obligation of learning from the teacher in class time to the student in their own time. The potential here is huge and for the most part gives more responsibility to the student. The trend to highlight the attributes that a blended learning paradigm can bring the modern day learner continues.

Blended learning refers to a language course, which combines a face-to-face (F2F) classroom component with an appropriate use of technology (Sharma and Barrett, 2007:p.7). A blended learning approach combines face-to-face classroom methods with computer-mediated activities to form an integrated instructional approach. In the past, digital materials have served in a supplementary role, helping to support face-to-face instruction. However, with the blended learning concept, technology plays a major role in the actual learning material. In a blended learning environment, class time would be reserved for `traditional` style face-to-face teaching of the technology, how it works, and later to present findings of course work learnt, see Figure 1. Below.

Meanwhile, the online portion of the course can provide students with multimedia-rich content at any time of day, anywhere the student has Internet access.

Figure 1. Blended Learning Methodology (from www.eduriser.com)

Blended Learning provides a proportion of online e-learning, mobile learning and the

more 'traditional' classroom based learning all within the framework of one course.

For further information go to: www.eduriser.com/blended-learning.php

Blended learning enhances collaborative style learning, whereby learners are encouraged to learn autonomously online through the use of software introduced during class time. According to its proponents, the strategy of blending the use of technologies into the more traditional style classroom learning creates a more integrated approach for both instructors and students. As such blended learning is a very popular topic area in the wider field of education and in the more localized field of foreign language learning which this paper takes.

The third theme of this thesis is closely related to the first two and involves giving more responsibility to the learner to learn independently. This third theme aims to highlight the potential that learning independently can provide and is referred to throughout this paper as "learner autonomy". Learner autonomy is also a very

popular topic of research in education at present and is firmly linked with both technology in education and blended learning.

1.3 Learner Autonomy

For many years the teacher, particularly in the Asian context (Littlewood, 1999, Kumaravadivelu, 2008, Kobayashi, 2011) has been the centre of the class and the director of knowledge who educates students with facts he or she, and the curriculum planners, deem fit. No matter how disguised, traditional teaching, is based essentially on the mug and jug theory (Rogers, 1983 in Benson, 2001) where the flow of knowledge is one way, from the teacher as the jug to the student as the mug. The concept of autonomy does not adopt this strategy and instead suggests that the teacher should act as a facilitator of learning guiding their students to independent learning. Knowledge should not flow from one source to another for authentic learning to take place and knowledge cannot be taught, but must be constructed by the learner (Candy, 1991). The facilitator must create a psychological climate by making the learner curious, creating enthusiasm, encouraging where possible, and producing the correct environment in which to learn (Benson, 2001). The teacher's role in nurturing the autonomous learner is vital and without mutual understanding and co-operation autonomy cannot be reached. This study attempts to highlight the importance of computer technology in this transition process.

1.4 This study

This paper will discuss how web-based technology in a foreign language class at higher education level in Japan was used to support and aid teachers and students in reaching their goals in improving test-scores and vocabulary acquisition through online technology. This study focuses on how technology helped change student opinion from a negative to a more positive stance and how it aided teacher professional

development in two groups of language students at a medium sized private university in southern Japan. On reading this research the reader can see how a blended learning approach to learning can not only change the mind-set of learners but also improve test-scores over a comparatively short period of time.

1.5 Survey 1

The majority of this study was administered over one academic year from April 2013 to January 2014 and involved two specific studies a pre-study and a main-study. The 'Survey 1' group entailed the introduction of a simple blended learning tool called Quizlet to support vocabulary acquisition in a group of 485 foreign language university students registered for an introductory TOEIC course. Eleven teachers with an average class size of 25 students instructed this group. Teachers were all trained in the use of Quizlet prior to the commencement of the study. Half of the group were instructed in fully equipped computer rooms with the most up to date facilities for two semester of one academic year. The other half of the group were instructed in regular classrooms without any computer facility for one semester and in a computer room for another. Instructors were advised to take full advantage of facilities available and were specifically told to use Quizlet. Quizlet was demonstrated and explained in full before the onset of classes. Communication between the teachers and the researcher maintained throughout the course of this study regarding Quizlet. The "Survey 1" group was the main source of quantitative data for this project. The purpose of this data was to determine if the use of computers and digital technology can benefit learners and improve TOEIC test-test scores. Constructs to be measured included motivation and attitude towards learning English, awareness of technology and anxiety levels.

1.5.1 Survey 2

The main-study, or ‘survey 2’ of this project involved the monitoring of a class of seven students in an intermediate level TOEIC class. This class was instructed in a computer classroom with one computer per student. Various online learning tools were introduced at different intervals that helped to aid the learning goals of the class. This class was instructed by the researcher for one year in unison with the ‘pre-study’ group. The technological tools introduced and learning goals for this class were somewhat more advanced than in the ‘pre-study’. These tools included learning with the digital flashcard tool Quizlet, using wikis as a collaborative learning platform and several other web-based learning tools. The main study was the main source of qualitative study for this project. It was determined that this data would help to answer the five main research questions.

1.6 Quizlet

Quizlet, initially formed in 2007 is a digital vocabulary-learning tool that enables users to create, combine and collect word lists individually or collaboratively with their classmates or public users of the site (Quizlet, 2014). Teachers create a class through the website which they in turn invite students to join. On joining, students then create their own word lists, which they add to lists during class and autonomously as they learn independently at a pace that suits them. Word lists are then synched between online and free mobile applications and can be accessed anywhere with an Internet connection. Quizlet do not specifically target foreign language learners, rather they provide a modern tool that makes learning and memorization of facts digital and fun.

Rather than their analogue paper counterparts, digital flashcards require very little time and effort to set up, they can never be lost and are far more versatile. Within the website, Quizlet offers several key functions to aid vocabulary retention through four simple tools called flashcards, learn, speller and test that promote vocabulary retention

by remembering words ‘learnt’ and those not ‘learnt’. On inputting a new word item users can then select a meaning from a built in dictionary.

Quizlet uses a clever in-built text-to-speech translation tool that gives almost native-like pronunciation for any word entered in the target or base language. Currently this service is offered in 18 languages. Quizlet is also closely linked to a popular online photo database (Flickr), providing visual aids to any word inputted. Both inbuilt tools can provide the correct pronunciation and a visual aid to any word or expression entered. These two functions are the main attributes that differentiate digital flashcards over analogue ones. Quizlet is the main source of blended learning referred to in this lesson study.

1.6.1 Wikis

> *Although many assume it's an acronym or a neologism, "wiki" is derived from the Hawaiian "wiki wiki," which is an adjective to describe something "quick" or "fast" The word has quickly permeated the English language, but the definition now refers to the concept of a collaborative writing application on the Internet*
> (Ullman, 2006 p. 87).

Wiki software in particular, is useful in the process of education for building independent learning spaces to which students contribute, and can support the social aspects of the teaching/learning process (Dlouhá & Dlouhý, 2009). While many new technologies have emerged throughout history, so has the cry for educators to find meaningful ways to incorporate these technologies into the classroom (Klopfer et al, 2009). The author Hall (2006) describes a wiki as “a collaboration of Web pages that can be easily viewed and modified by anyone, providing a means for sharing learning

and collaboration" (p.13). There are numerous Web 2.0 tools for educational use and benefit. These tools afford the added advantage of reducing the technical skill required to use their features, allowing users to focus on the information exchange and collaborative tasks themselves without the distraction of a difficult technological environment (Kirkpatrick, 2006). Such 'transparent technologies' (Wheeler, et al 2005) let the user concentrate more on the learning task by 'seeing through' the technology with which they are interacting. Many students now come to campus to learn about and learn with technology (Green 2000).

1.6.2 TOEIC Bridge test

For the pre-test and post-test ability would be measured using the introductory Test of English for International Communication, commonly referred to as the TOEIC Bridge test. The TOEIC test is a widely accepted English language comprehension test initially produced in Japan but now recognized as the global standard for English communication skill assessment (TOEIC, 2014). Many companies and universities in Asia perceive TOEIC as a realistic measure of a person's English ability. The TOEIC Bridge test is aimed at introductory level learners and serves as the "bridge" to the TOEIC test. This test served the purpose of accurately measuring overall English ability without a particular focus on either one of the four skills.

1.7 Aims and objectives

The main objective of this thesis is to prove that technology, in the form of several blended learning elements, can enhance and encourage autonomous learning at the foreign language university level in Japan. Through the introduction of carefully selected blended learning tools, data was gathered to suggest that test results and language ability can be enhanced by the introduction of digital technology.

1.7.1 Hypothesis

The hypothesis of this study proposed that students with more exposure to computer technology would show higher gains in improvement. It was predicted that the addition of a blended learning component could amplify test scores, raise awareness to learning with technology and improve overall language ability. In the pre-study it was anticipated that students who were instructed in computer rooms would obtain higher test scores than those who were instructed in regular classrooms. However with the 'main-study' it was predicted that students' impression of technology could be greatly enhanced while encouraging autonomous learning outside of class.

1.8 Research Questions

There were five main research questions constructed for this study.

1. To what degree can technology positively enhance test scores over one academic year in a group of beginner level university students?
2. Can the introduction of several online blended learning language tools raise awareness of technology and motivation to learn?
3. How can a blended learning addition to a test-based course encourage autonomous learning?
4. Can teachers show an improved awareness of adopting technology in class?
5. How can this study provide evidence of a change in student learning technique to influence education at the macro level?

Chapter 2 – Literature Review

There is no doubt that technology in the modern era is having a huge impact on education. Whether this impact be from the influx of smartphone technology, the current tablet computer trend or the incessant advertising campaign of computer based companies to get us to buy the latest and fastest hardware, there is no denying that technology is influencing the way the younger generation of today act, in and out of our classrooms. This section of the paper will introduce the huge array of literature available on the three main themes of "technology in education", "learner autonomy" and "blended learning". After introducing literature from a wide source and time frame, literature to support the main hypothesis of this dissertation will be introduced. All literature will be reviewed objectively with reference to the main research questions of this paper. Finally any gaps in the literature that are discovered will be highlighted and addressed in the closing stages of this chapter.

2.0 Technology in Education

Present day computers and the Internet, just like the initial introduction of pencils and paper, have revolutionized education by making access to facts and information instantaneous greatly changing the way we learn. The modern and dynamic world of education is constantly adapting these technologies for the benefit of teachers, students and society in general. Prensky (2011), claims that with current available technologies students are now learning in a way that was never imaginable. Warschauer, suggests three main goals for using technology in education: (1) to improve academic achievement, (2) to facilitate new kinds of 21st-century learning, and (3) to promote educational and social equity (2011). Modern day technology can make the transition from teacher dependence to learner independence that much smoother, further promoting the concept of learner autonomy in contemporary pedagogy.

2.1 Academic Achievement

As students around the world enter college, the general commonality is that they do so to improve their job opportunities later in life. In order to graduate any educational institution you must conform to a certain level of academia and achieve specific targets set by local or regional educational boards. According to Warschauer, "poor academic achievement tragically impacts life opportunities" (2011, p.6). He continues that those students who fail to graduate high school earn on average 40% less per year, compared to those students who graduate university with a bachelor's degree and 80% less for those with a masters degree or higher in the U.S. (U.S. Census Bureau Congress, 2010). If academic achievement can be augmented by technology then it stands to revolutionize education.

2.1.1 21st Century Learning

According to Warschauer (2011), the second basic goal of introducing technology in education is to facilitate new kinds of learning through computers and other technological means. Warschauer makes the comparison of modern day learning technological trends in education to the initial stages of industrialization. Literacy pedagogy, claims Warschauer, "typically involved rote learning, oral recitation, copying, and imitation of correct speech and writing" (2011, p. 11). As educational visions of goals of literacy and learning changed from the agrarian era of the 19th century to the industrial era of the 20th century, so too must they change in the post-industrial era of the 21st century.

2.1.2 Social Equity

Although of less relevance to the more or less homogeneous society of Japan, the final factor that Warschauer suggests as the third goal for using technology in education is to promote educational and social equity (2011). A study by Rideout,

Foehr, and Roberts (2010) suggested there were varying degrees of Internet access at home when comparing families where the parents graduated from a tertiary institution at 91% as opposed to those parents in families who didn't at 74% (in Warschauer, 2011, p. 21). It was also stated in this study that computer ownership and Internet access alone was not the issue, it was how the technology was used for educational gains.

Although the results of this study may be less relevant to Japan there is one commonality that does prevail. In Japan there is still a level of unbalanced sexual equality in modern society. According to Ono and ZavodnY (2005) there are still substantial differences in institutions and social organizations regarding the use of information technology. Ono and ZavodnY state that since 2001 there still maintains differences and trends in computers and Internet usage in Japan (2005) between the sexes. Another observation made by Ono and ZavodnY was that working women have lower levels of IT skills than working men. Warschauer predicts that through the efficient use of technology in education, social equity between the varying racial groups in multi-cultural countries like the US and UK or between the sexes in predominantly mono-cultural countries like Japan, can be enhanced.

2.1.3 No Child Left Behind

In the year 2001 the No Child Left Behind Act (NCLB) was introduced to reform education at the school level in the US. The NCLB act aimed to improve education for all students from all backgrounds leaving no child underprivileged and the opportunity to offer the same level of education to all classes of society. Shaffer and Gee (2005), declare one major drawback to this act. As production lines of basic commodities and manufacturing move elsewhere, countries like the US, the UK and much of Europe who cannot compete with low-wage countries will instead have to focus on jobs in

innovation. Careers in the production line of basic commodities will most likely vanish in such countries and be replaced by careers in technological innovation (Shaffer and Gee, 2005). According to Warschauer "educational reform must address the kinds of skills and practices needed in the world our children will grow up in, and better use of technology in schools is essential for achieving this goal (2011, p. 11). Many of the jobs that students of today will enter into may not currently exist in society. Adaptive expertise, according to Hatano and Oura (2003) is "needed today more than ever in the rapidly developing economy that requires people to change jobs frequently or respond innovatively to new environments and situations." (in Warschauer, 2011, p. 19). Not only is it essential that schools and tertiary institutions implement the use of technology for students' future successes, but it is also important for them to maintain a balanced student intake as universities compete for numbers.

2.1.4 Digital Wisdom

Current trends of society in the developed world show huge potential for autonomous learning with the help of technology. If current pedagogical methods are to keep up with these trends and the younger generation in general, then the use of digital technologies in classrooms is imperative. Today`s students, according to Prensky, have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age (2001). Prensky (2001) states that today's college graduates prefer digital text to analogue text and obtain the majority of their wisdom digitally. Prensky terms this as `digital wisdom` and refers to current day students, as `digital natives` whereas their teachers, who are perhaps less technologically, savvy are `digital immigrants`.

The teachers of today`s net generation, referred to as '*digital immigrants*' by Prensky (2001) appear to speak the language of digital technologies, but with '*a thicker accent'*. According to Prensky (2001), Tapscott (2009) and Williams (2006), teachers of today must learn to implement technology into their classrooms or contemplate loosing their students. The `*one size fits all*` mentality (Tapscott, 2009) in which knowledge can be disseminated to all learners regardless of individual differences or learning styles is out-dated.

2.1.5 Technology Learning Criteria

In relation to Warschauer's (2011) 3 basic principles of using technology in education Fellner and Apple refer to a similar list of criteria when integrating computer aided tools into a foreign language programme. Before any new software package, online educational tool or any CALL based addition is made to a programme it must first be evaluated for appropriateness. As Fellner and Apple state, "all computer based tasks within a course should not only complement each other as much as possible but also enhance the learning that takes place within the traditional classroom component of the programme" (2006, p.16). They claim that there is a list of 6 criteria that must be addressed when choosing an appropriate technological tool. This list was initially proposed by Carol Chappelle (2001), and has been further extended to 7 by Fellner and Apple (2006). The criteria were:

1. Language Learning Potential
2. Learner Fit
3. Meaning Focus
4. Authenticity
5. Positive Impact
6. Practicality
7. Enhancement

Chapelle (2001, p.55) and Fellner and Apple (2006, p16)

2.1.5.1 Language Learning Potential, Learner Fit and Meaning Focus

The first criteria 'language learning potential' refers to the extent to which the task can be considered as an activity for language learning and not just simply an opportunity for language use. According to Chapelle, the subtle difference between language use and language learning may be "characterized by the extent to which the task promotes beneficial focus on form" (2001,p.55). There are many online tools which simply provide a platform to use a foreign language, but do not necessarily focus on form per se. The huge array of online audio or video editing and communication tools would be examples here. Whereas, 'learner fit' refers to the actual linguistic ability and if the intended CALL tool is appropriate for the intended target audience. Skehan, a leader in the field of second language acquisition (1998) claims that "if the language within a CALL task is already known to the learner, the task presents no opportunity for development" (in Chapelle 2001, p. 56). Both these criteria apply to the main blended learning focus in this paper of Quizlet the digital flashcard online tool. Quizlet focuses on specific vocabulary lists created individually by each student specific to their needs, it also focuses on meaning and provides ample learning opportunity with the 5 'study tools' it incorporates within its learning platform.

2.1.5.2 Authenticity, Positive Impact and Practicality

Authenticity refers to the target learning task and course design in which the new CALL tool is intended. An authentic technological tool would focus on the intended language task and would encourage communication that the target audience would most likely encounter outside of the classroom. In the case of this thesis study, Quizlet would appear to be a very authentic learning tool as the main objective of the class is to improve TOEIC test scores and overall ability. All of the words inputted into student created lists are expected to appear in the test in some form or another. 'Positive impact' refers to the influence the learning tool has on the student in a

positive way. In an ideal scenario this may involve a transition of learning styles and a development of learners' metacognitive strategies and not just focus solely on language. The final criterion suggested by Chapelle (2001) involves the practical side of the tool, its usability and user-interface. An online-based tool would be far more practical and have a greater impact on the student if it could be accessed through a handheld device. During the time of publication for this piece in 2001, Wi-Fi and mobile technology were still quite rudimentary, however now in 2015, they are both far more advanced and have greatly influenced the practicality of CALL tools.

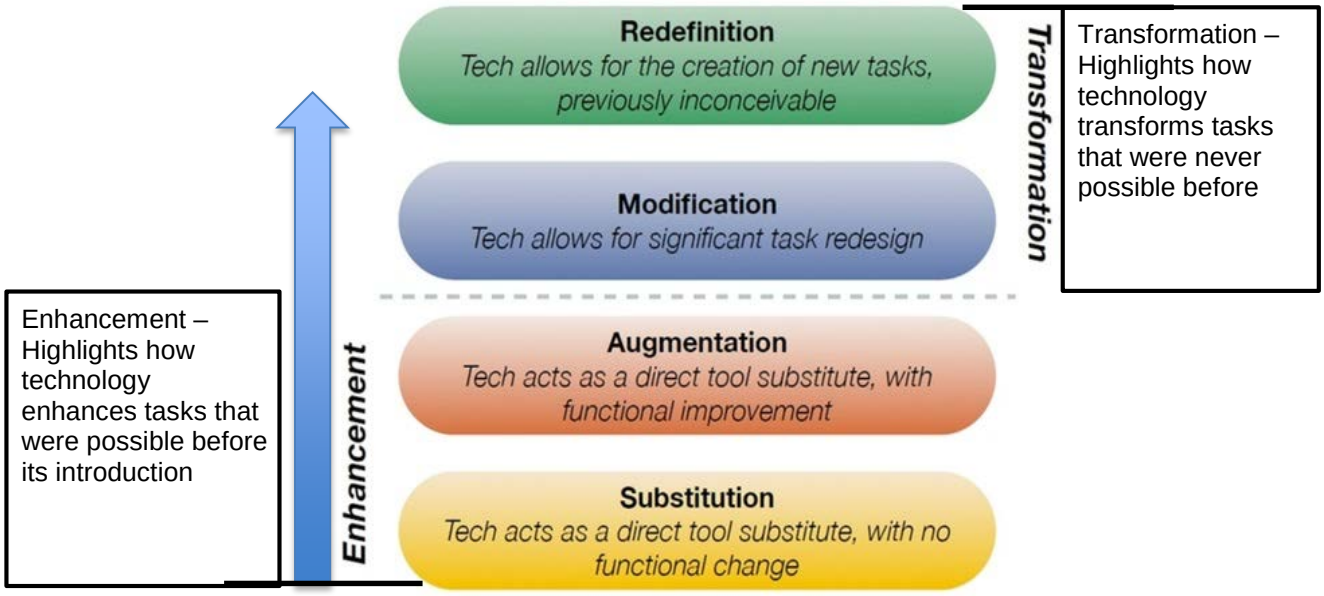
2.1.5.3 Enhancement

Fellner and Apple further suggest a seventh criterion to this list, 'enhancement'. They claim that 'there is little justification in using computers or software just because it is available'. More importantly they state that "any CALL task selected provide some potential enhancement or benefit over more traditional pedagogical approaches" (2006, p.16). The CALL addition to an established foreign language programme should enhance what is already in place. In the case of Quizlet , digital word lists far out perform their analogue counterparts which they originated from. Although the principal is the same, the enhanced experience of digital flashcards can provide a far more valuable learning experience than their analogue counterparts by providing pronunciation and a visual aid to almost every item entered.

2.1.5.4 SAMR Model of Technology in Learning

Similar to the 6 criteria of introducing technology to learning put forth by Chapelle (2001) and later extended to 7 by Fellner and Apple (2006) Puentedura (2009) designed a 4 stage model of introducing technology to education called the SAMR model. The SAMR model or Substitution Augmentation Modification Redefinition model offers a method of seeing how computer technology might impact teaching and learning.

Figure 2. The SAMR Model



Adapted from of Ruben Puentedura http://www.hippasus.com/rrpweblog/ (November, 2013)

Substitution refers to the computer technology being used as a substitute for something that could ordinarily be done without computers, for example by using a word processing computer tool in place of a notebook or pen and paper. Augmentation refers to a technological tool augmenting what was used previously to perform the same tasks in an improved manner like Microsoft Office tool excel that calculates basic statistical calculations at the touch of a button (Shrock, 2013). Whereas modification and redefinition transform the tasks that may never have been possible previously. Modification refers to a completely modified way of accomplishing a learning task. This task will involve computers or technology in a way that allows a significant change by using audio, visual or digital means. One example in the field of foreign language learning could be the instructor using a collaborative writing tool that enables students to see what their classmates are writing and provide feedback and work collaboratively with each other which modifies ways in which students used to learn. The final stage in this model is redefinition and refers to completely redefining

the way the learning task is conducted. During this phase learners are using the computer based tool to learn in a way that was never possible before by using visual aids, sound files and possibly video simultaneously in a way that could not be performed without computers. In effect this section of the model introducing a new learning paradigm to the learner and greatly expands their learning horizons allowing and promoting more learning out of class than in class.

Quizlet, the digital flashcard tool would be a good example of how learning vocabulary has been redefined. Quizlet allows users to instantly receive near perfect pronunciation for words with direct translation in one of several languages while also providing a visual aid for each word item where appropriate. Although these functions can be performed solely without computers they cannot be performed accumulatively without them. Quizlet also allow users to work collaboratively by providing access and editing permission if required, to all students in the same class. On completing simple tasks within the confinements of the Quizlet tool students can also compete with other members of the class in word games that again encourages collaborative learning.

2.2 Learner Autonomy

Autonomous learning is increasingly becoming a modern approach to English language education, which many teachers, usually of European or North American origin, strive to develop in their learners. Learner autonomy gives more responsibility to the students in their own learning, and if successful, has the potential to aid learners in their future learning careers.

Defining autonomy can be a difficult task as meanings may be interpreted in different ways by different people. Autonomy in learning involves learners taking more control of their learning, in and out of their classrooms. Autonomy in language

learning conversely is the notion of people taking more control over the purposes for which they learn languages and the ways in which they learn them (Benson, 2006). One important component behind `learner autonomy` is that “language learning is a lifelong endeavour” (Lee, 1998:p.282) and that students learn more outside of class than they do in class. The process however, of making students ‘autonomous` is a lengthy and complicated one. In order to promote the idea that more learning is done outside the classroom in student’s own time than during classes, students must be directed in how to learn by themselves. This concept of autonomous learning may in fact be a cultural trait more attuned to the Western teacher (Littlewood, 1999) and unknown to his or her students in Japan.

The control that each student has over their learning differs, and the methods each person uses to learn are unique. Benson (2001) explains that autonomy is a multidimensional capacity that will take different forms for different individuals. The autonomous learner is recognised by specific behaviour, but this behaviour can take many different forms depending on the student’s age, their progress so far and what they perceive learning to be (Little, 1991). One thing is clear, that the autonomous learner must be interested and motivated in what they are doing enabling them to become responsible for their own learning. It is the teacher’s job to initiate the step to learning independence.

2.2.1 Misconceptions of Learner Autonomy

There are several misconceptions involved with the term autonomy. The first of which is that autonomy may be viewed as the process and teaching style. Another is that teachers “teach” autonomy. Autonomy is a product not a process. Autonomy is not something that teachers do to learners (Little, 1990). Teachers should first understand the meaning of the word, and the product involved in being autonomous.

Autonomous language learning does not simply mean learning by oneself (Iida, 2009). Autonomy is not teacher independence, but teacher-learner interdependence (Little 1995, Iida 2009). As teachers we have to facilitate and motivate our students in a way so that our students become autonomous someday, not just say, *"starting today you are autonomous"*. With time, and guidance from teachers, students should gradually learn the benefits of autonomy and the potential for future endeavours which it can offer.

2.2.2 Methods Used to Introduce Autonomy

Introducing innovative methods of teaching to educational institutions in countries where they may not be the norm can be challenging. Jones (1995), a language instructor of Western origin, spent a year in Cambodia trying to introduce the concept of learner autonomy to a group of Cambodian students completely new to the idea. He did this by establishing a self-access centre (a facility that provides an ample supply of resources learners can use to improve their language ability at their will and more importantly, a place that they have complete free access to). He found that in order for students to make full use of the access centre and to become autonomous, students would have to be taught how to use it. Jones (1995) claimed that 'most successful learning takes place outside the classroom' (1995:p.228), in order to accomplish this task students must be taught the positive attributes of 'how to learn' by themselves. Jones (1995) also discovered that for students to become autonomous it is necessary for the teacher who is initiating the process to have an understanding of learner beliefs before progress can be made.

Jones discovered that rather than passing all responsibility to individual students it was more efficient to get students to work together, to collaborate with each other, and pass responsibility onto groups of individuals. Through other similar studies, Iida

(2009) tried to promote learner autonomy in learners of Japanese in the United States by introducing weblogs. Iida`s idea was to introduce collaborative learning through the use of the Internet where students would collaboratively learn together by communicating through weblogs. This entailed learning from each other through a weblog on the Internet where all students were involved, including the teacher. Collaborative learning through an impersonal body, such as the Internet, takes the focus off student face-to-face interaction. This may prove beneficial to the less talkative students who are more comfortable learning in this way (Iida 2009). Studies like this one show that engaging in dialogue about the learning process between learners and the teacher are essential to foster learner autonomy, or simply that collaboration is a crucial factor to promote learner autonomy (Iida 2008, Little 1995). Autonomy is not complete learning independence, but more learner and teacher interdependence.

2.2.3 The Transmission Model of Communication

For many years the teacher, particularly in the Asian context (Littlewood, 1999, Kumaravadivelu, 2008, Kobayashi, 2011) has been the centre of the class and the director of knowledge who educates students with facts he or she, and the curriculum planners, deem fit. No matter how disguised, traditional teaching, is based essentially on the mug and jug theory (Rogers, 1983 in Benson, 2001) where the flow of knowledge is one-way, from the teacher as the jug to the student as the mug. In modern teaching terms, this conventional method of instruction might be referred to as the Shannon and Weaver ‘transmission model’ theory of communication established in 1949.

The transmission model of pedagogy refers to the belief that education is a specific body of knowledge that is transmitted from the teacher to the student. The teacher’s

role in the transmission model is *"to prepare and transmit information to learners."* While the learners role is *"to receive, store and act upon this information."* (Tishman, Jay and Perkins 1993, pp.149). This understanding emphasizes teacher-centred learning where students are passive absorbers of information and that the purpose of learning is the memorization of facts. This model does not affirm learning and merely indicates memorization of facts and bypasses actual comprehension of what is being learned.

Autonomy does not adopt this strategy and instead suggests that the teacher should act as a facilitator of learning. Knowledge should not flow from one source to another for authentic learning to take place and knowledge cannot be taught, but must be constructed by the learner (Candy, 1991). The facilitator must create a psychological climate by making the learner curious, creating enthusiasm, encouraging where possible, and producing the correct environment in which to learn (Benson, 2001).

2.2.4 Technology as an Element of Change

Tapscott (1998, 2008) suggests that the 'net generation' have the ability to change learning as we may know it. Students of today bring with them a truly transformative power to supplant the conventional pedagogy of the "digital immigrant" to one based on more interactivity and collaboration. Tapscott claims that learning will become more interactive with the use of technologies. Also referred to in Thomas and Reinders, (2012:p.229) the interactive type of pedagogy is identified with a movement from:

1. Linear to hypermedia learning
2. Instruction to construction and discovery
3. Teacher-centred to learner-centred education
4. Absorbing material to learning how to navigate and how to learn
5. School to lifelong learning
6. One-size fits all to customized or personalized learning
7. Learning as torture to learning as fun
8. The teacher as transmitter to the teacher as facilitator.

As Haddad and Daxler, (in Allford and Pachler, 2007) declare that a focus on how to learn, problem-solve and synthesize the old with the new can lead to education for everyone, education anytime and education anywhere. This transitional phase may appear as a relatively new phenomenon to education. Historically the concept has long been known and understood but very rarely actively pursued in the classroom.

2.2.5 Learner Autonomy in History

The concept of learner autonomy is by no means new to education. More than one hundred years ago the notion was first purported by John Dewey. Dewey (1859-1959), the late philosopher, educator and founder of the still much used phrase "*learning by doing*" was one of the original initiators of the concept and well-respected in the field of learner autonomy. In two of his most influential pieces, "The Child and the Curriculum (1902)" and "Democracy and Education (1916)" Dewey discusses two major conflicting schools of thought regarding educational policy. The first of which centres on the institutional curriculum with a focus almost entirely on the subject matter to be taught. Dewey argues that the major fault with this principle is the inactivity of the student; within this particular framework, "the child is simply the immature being who is to be matured; he is the superficial being who is to be deepened" (1902, p. 13). This bold statement suggests that children will learn more if they are actively involved with their learning. The argument here is that in order for education to be most effective the student must be presented the content matter in a way that allows them to relate the information to prior experiences.

Whereas, the second school of thought focused on the excessive level of freedom falsely given to the student. Occasionally, instructors may misinterpret the concept and give too much freedom to their students. According to Dewey, "we must take our stand with the child and our departure from him. It is he and not the subject-matter which determines both quality and quantity of learning" (Dewey, 1902, p.13-14). The

likely flaw with this frame of thought is that it minimizes the importance of the content as well as the role of the teacher. The role of the teacher, in a pedagogy that aims to enhance autonomy, is pivotal.

Dewey published on a wide range of topics, many of which are still regularly cited and used in teacher education courses around the world today. "Democracy and Education" (1916) was a landmark work on public education in which Dewey discusses methods of providing quality education in a democratic society. Dewey's ideas went on to impress the minds of many other influential, experiential models and advocates of educational theory that are widely used in education today.

The general concept of "learning by doing" is not solely confined to the works of Dewey. Several other figures, philosophers and other well-respected theorists in history have made similar observations over time. It is widely believed that Benjamin Franklin, the great 18th century philosopher and anthropologist claimed the following, which indirectly refers to the concept of 'learning by doing' and autonomy.

"Tell me and I forget,
Teach me and I may remember,
Involve me and I learn."

Benjamin Franklin (1706-1794)

This quote is commonly attributed to Benjamin Franklin who died in 1790, but there is little scientific evidence that it was Franklin who made it. It is not entirely clear as to the origins of this quote, although it is widely regarded it may have derived from the Chinese philosopher and reformer, Confucius (551BC to 479BC). The quote more generally regarded with Confucius is similar and implies that the more students are involved with their learning the more they will learn.

“I hear and I forget.

I see and I remember.

I do and I understand.”

Confucius (551BC to 479BC).

The relevance to Dewey’s initial work over 100 years ago to the fundamentals of Confucius and Franklin, and to that today of the increasing use of technology in education is substantial.

The educators of today should not only involve learners more with their learning, but also direct this learning to personal experiences with which their learners can relate to. I declare that the modern day tool in which teachers can do this with, and with which the young generation of today is most likely to relate to, is technology.

2.2.6 The Benefits that Technology Can Provide

Similar to the aforementioned ‘traditional style’ of learning where most educational institutions were based on the ‘top-down’ approach to learning Thomas and Brown (2011) highlight the addition to learning that technology can provide. They state that “for most of the twentieth century our educational system has been built on the assumption that teaching is necessary for learning to occur”. Accordingly, education has been seen as a process of transferring information from a higher authority (the teacher) to a lower one, the student (2011, loc:299). However, what Thomas and Brown advocate is that this model is out-dated and due to the rapid rate of change in the 21st century it is time to change the ‘old model of teaching to a new model of learning’ (2011,loc:321). They pose that new models of teaching must coincide with new models of learning. Technology used in the right way can be the catalyst to implement this new model.

2.2.6.1 The Mechanistic Approach

They also refer to this ‘traditional theory of learning’ as the mechanistic approach of teaching. In this so called ‘mechanistic approach’ learning is treated as a series of steps to be mastered, as if students were being taught how to operate a machine or even, as if the students themselves were machines being programmed to accomplish tasks. The endpoint of such mastery is efficiency and in making the student, the machine to work at its most efficient rate possible.

What is being suggested here is that the way learners learn now is changing. The revolutionary transition that technology has had on education is obvious and has brought about radical change in the way our learners learn. As learning styles continue to change with the trends, teaching styles must also change to adapt to these new learners. Thomas and Brown (2011) continue with this notion by explaining how the Internet in particular has changed education. Here again emphasis is made on the way the Internet as a learning resource has changed the way we learn and interact with each other. The more we interact with the Internet as an informational space, the more the environment changes, and the very act of finding information reshapes not only the content that gives that information meaning but also the meaning itself” (2011, loc. 448). The implicit meaning behind these points is that technology should not only be implemented in education but it should also be applied in a way that adapts to the frequent changes and evolving that it takes.

What is being discussed here is that not only should technology be implemented in education but it should also be applied in a way that adapts to the frequent changes and evolving that technology takes. There is much truth in the statement of diversification in education which can be summed up by the following expression.

“Different people, when presented with exactly the same information in exactly the same way, will learn different things.” (2011, loc.1046).

2.2.7 Collective Learning

One of the key factors introduced in this study is the element of collective and collaborative learning and how particular online learning tools can support them. Thomas and Brown, again discuss the change in learning style that can encourage and support collaborative learning. They further explain that until very recently, we have lacked the necessary tools and technology that can make this possible. They continue, that the drive to learn collectively is driven by passion and play and “is poised to significantly alter and extend our ability to think, innovate, and discover in ways that have not previously been possible” (2011,loc. 1227). Innovative technological tools can support collective learning and help students to learn collaboratively in ways that were never previously possible.

2.2.8 Vygotsky

Another eminent theorist in the field was Lev Vygotsky the Russian psychologist (1896-1934). Vygotsky conjured up two prominent theories that are relevant to this study. The first of which was termed the sociocultural approach to learning. This theory stresses the interaction between young people and the culture in which they live. Through the sociocultural concept of learning Vygotsky believed that children did not learn individually, rather they learned collectively through interaction between peers. Although published almost 80 years ago Vygotsky is also widely respected and referenced today. Cullen and Kullman (2013) refer to Vygotsky giving primary attention to the concept of cognition and social cohesion. Firstly, cognition, they claim can be closely linked to the Vygotskyian (1978) concept of sociocultural theory, which sees “learning as a process of socialization and acculturation through interaction with

more knowledgeable others in pursuit of a learning goal." Cullen and Kullman relate this to a case study they conducted using wikis to log writing tasks online whereby students learn collaboratively by commenting on each other's posts.

One crucial point behind Vygotsky's sociocultural theory is the social interaction that learners have with each other. Vygotsky stressed the essential role that social interactions with each other that children or learners play in cognitive development. In short, he states that students influence each other more than teachers ever could and as such creating an environment that encourages collaborative learning will help them to learn more. One conclusion that was made by Cullen and Kullman was that the emergence and rapid development of online technologies over the past 20 years has created exciting possibilities for collaborative learning, possibilities that will inevitably keep on expanding (Cullen and Kullman, 2013,p.433). Their study focused on the use of wikis to encourage collaborative learning. They concluded that although wikis can be utilized with beneficial outcomes for social learning the technology itself does not guarantee learning. They also claim that additional components connected to the implementation and evaluation of the task including teacher guidance and interventions are needed to support the learning process.

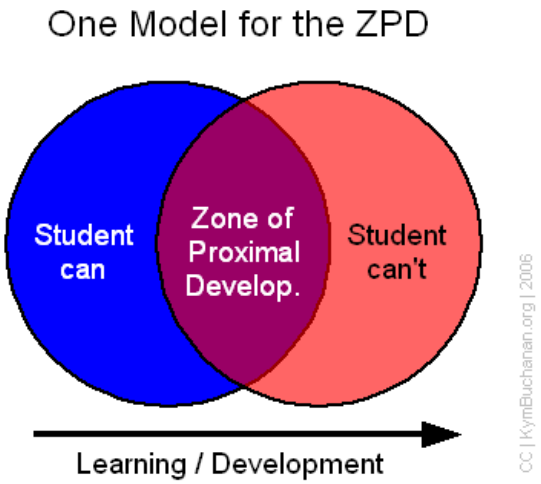
2.2.8.1 Zone of Proximal Development

Another related concept also proposed by Vygotsky is known as the zone of proximal development. This theory refers to "all of the knowledge and skills that a person cannot yet understand or perform on their own yet, but is capable of learning with guidance." (What is Sociocultural Theory?, 2015). The appropriate technological addition to an already established foreign language programme can help students to learn collaboratively by creating the zone of proximal development and encouraging collaborative support from more knowledgeable peers or the instructor. Over time,

students can develop more as learners and as they become more proficient with the technological skills acquired.

Very little literature is available that can provide empirical evidence to suggest that collective and collaborative learning can benefit students. It is my prediction that the technological tools used in this study can support collaborative learning and suggest with empirical evidence that such tools can improve test scores and overall ability at the foreign language level in Japan.

Figure 3. The Zone of Proximal Development



Retrieved from: Cherry, K. (2015).
http://psychology.about.com/od/developmentecourse/f/sociocultural-theory.htm

2.3 Lesson study

There are several ways for teachers to learn collaboratively and improve their teaching techniques. One such practice that is gaining worldwide attention is “lesson study” which originated in Japan as a means of improving pedagogical techniques and confidence in teaching practice in elementary school. Lesson study involves a process in which teachers jointly plan, observe, analyse and refine actual classroom lessons on any subject matter which are called “research lessons”. Lesson study is gaining huge popularity the world over for being a pedagogical theory that aids

professional development and encourages teachers to learn from each other and learn collaboratively to further develop their teaching techniques.

By collaborating together about teaching techniques and pedagogical theories, teachers can learn from each other, develop their skills and confidence in teaching their subject matter. According to the Lesson Study Research Group in the Teachers College at Columbia University, lesson study "is a professional development process that teachers engage in to systematically examine their practice, with the goal of becoming more effective." (Lesson Study Research Group, 2005). According to Stigler in Fernandez and Yoshida (2004) lesson study is quite simple and obvious "if you want to improve education, get teachers together to study the processes of teaching and learning in classrooms, and then devise ways to improve them" (2004,p.4).

Catherine Lewis also highlights the advantages it can bring to all involved. Lesson study as an intervention into the work-place culture in classrooms and schools is specifically designed as a means of improving teaching by enabling teachers to build and share knowledge of teaching and learning (Lewis et al., 2009, p. 142). The relevance to lesson study at this stage in this thesis is that it can be a good way for teachers to collaborate and learn how to incorporate new technological tools into their teaching regime. Relevant and up to date literature on the topic will now be introduced.

2.3.1 How Technology Can Aid Learners in the Lesson Study Framework

Lee and Ling (2013) highlight the important role of teachers in achieving change and reaching objectives in lesson study, "teachers play a very important role in bringing the intended curriculum to life in classrooms, and lesson study provides a process through which the intended, enacted and lived curriculum could be brought closer together." (2013, p. 205). Lesson study can change the way teachers think about their pedagogical methods, help them improve the way they teach and acts as a

body in which teachers can provide feedback on each others work. This study proposes that the engine of this change to be technology and the advantages that online learning tools can bestow on the teacher and learner.

Lee and Ling (2013) again provide reference to the paper by Chen and Yang (2013) about “thematic teaching” or teaching based on students’ interest. This type of approach, requires teachers to ‘move from a traditional teacher-centred and subject matter centred approach to teaching a language in a more holistic way’ (2013, p. 202). Their study emphasized the significance of how lesson study gives teachers the chance to capture their thoughts, actions and especially group interactions as teachers to try and understand the implications of any new reform introduced.

Furthermore, Takahashi, Lewis and Perry discussed, through their extensive lesson study experience, the valuable opportunities that it provides researchers and teachers (2013). Lesson study provides the body in which teachers can openly discuss and comment on contents and methodology adapted in lessons. By providing teachers with the opportunity to learn in this way, lesson study provides “a natural way to connect new instructional ideas to one’s own teaching practice” (2013, p. 249). Other recent papers by Tan-Chia et al. (2013) and Olander and Sandberg (2013), both collectively emphasize the point that ‘implementing new curriculum ideas in class is not a simple process’. Despite this remark, lesson study provides a process which makes change possible and what’s more, encourages it. When new technological innovations are introduced to a class, lesson study could be a very valuable way of having teachers learn collaboratively in how to use the new tool most effectively. It is a travesty that there is not more literature available in the field of lesson study that does this. This thesis aims to fill this literature gap.

2.3.2 PDCA cycle:

There is a simple cycle that lesson study is based on and which many other professional development programmes have adopted. The plan-do-check-act cycle or more commonly named the PDCA cycle involves 4 simple procedures. Plan refers to the physical planning of the lesson regarding class tasks and class goals at the micro-level of course design. Do, refers to the actual lesson and teaching process which under the guidelines of a typical “lesson study” could be observed by all teachers involved in the research group. Check, refers to the evaluative measures in place to see if what was initially planned has been effective whereas ‘act’ refers to the process of collectively acting upon what was observed. According to the learning process of “lesson study”, the PDCA cycle is predominantly a collaborative teaching process that encourages communication and professional development of teachers and their pedagogical skills. If achieved successfully this four step process should result in an improved lesson which has greatly evolved from the first stage. See below for a simplified version of the four-step process as described by Fernandez and Yoshida (2004).

2.3.2.1 The Four-Step Collaborative Process of “Lesson Study”

Step 1: Collaborative planning of the lesson (Plan)

This section of a lesson study involves the teachers meticulously planning the lesson. All teachers taking part in this process work collaboratively in a group sharing their ideas and past experiences and current knowledge of the target students and the content that is to be taught. The end product of this step is a well constructed lesson plan that has been created and agreed upon by the entire group collectively.

Step 2: Teaching of the lesson (Do)

The next step is for the teachers involved to implement their lesson plan agreed upon in step 1. This step could possibly involve other teachers from the group further observing each other and collaborative feedback.

Step 3: Discussion of the lesson (Check)

After completing the planned lesson teachers further meet together to provide feedback and check to see if the planned objectives were met. During this stage of the process teachers collaboratively provide feedback to further improve the lesson.

Step 4: Revision and further conducting of the lesson (Act)

This final steps incorporates all feedback and suggestions received in the above steps and in theory should provide the researchers with more confidence and suggestions to implement the lesson in an improved manner to that of step 1.

During this four-step process teachers should have acquired a list of suggestions and ideas to help improve overall lessons in any context. The lesson study approach can help learners to learn from each other and share ideas that work. The practice of lesson study has a widespread following at the primary level of education in Japan, where it was first founded (Takahashi, Lewis, Perry, 2013) and accepted as an internationally coveted pedagogy. However, there is as yet little research at the tertiary level in Japan and even less in foreign language education. Lesson study as a profound and much respected pedagogical theory is lacking empirical research in the field of foreign language learning at the tertiary education level. What's more, lesson study provides an ideal format for introducing elements of technology into teachers techniques and students learning skills through the blended learning courses.

2.4 Blended Learning

Blended learning as previously defined in chapter 1 of this thesis refers to any course that incorporates a traditional F2F classroom component with an appropriate use of technology. In the context of language learning the term technology can refer to any use of online activity, mobile learning activity or offline computer software. What with the increasing volume of e-learning tools, language learning tools and smartphone applications in circulation the possibilities in this construct are endless. As Sharma and Barrett state "a blended-learning course is potentially greater than the sum of its parts, and positive learning outcomes are most apparent when clear roles are assigned to the teacher and to the technology" (2007,p.7). If the correct technological tool is selected and used effectively it can be blended into a regular class and greatly enlarge the learning boundaries of the student.

> *"Blended Learning is commonly associated with the introduction of online media into a course or programme, while at the same time recognising that there is merit in retaining face-to-face contact and other traditional approaches to supporting students. It is also used where asynchronous media such as email or conferencing are deployed in conjunction with synchronous technologies, commonly text chat or audio."*
>
> Macdonald (2006, p.2)

Most of the literature above exemplifies the positive attributes of technology in education in general. Now that this point has been verified, a different approach will now be taken. This proceeding section will highlight literature in the field in ways of blending technologies into foreign language learning.

2.4.1 Learning with Smartphones

Wang and Smith (2013), did a study on Japanese learners perceptions of developing English reading and grammar through smartphone or mobile phone platforms. They discuss that the smartphone ownership rate is increasing exponentially in Japan and that due to huge improvements in high-speed Wi-Fi capabilities; many students are replacing their computers with their smartphones. Due to the current advances in mobile technology regarding processing power of CPUs, the ability to store large amounts of data and the increasingly large screen size, PCs are being replaced by smartphones for many students in Japan. According to Wang and Smith, "the gap in the operational functionalities between mobile phone and PC technology has narrowed" (2013, p.117) this allows for far greater freedom in extending learning outwith the confinements of the classroom.

Nonetheless Wang and Smith made two important conclusions from their paper. Firstly, Japanese students will not autonomously be engaged in mobile learning if content offered is not a compulsory element of the course grade. They found that motivation levels remained low due to dull content of grammar quizzes and reading material offered. In order to encourage the use of mobile learning to develop language skills grammar quizzes should be avoided and reading materials need to be interesting and relevant to students' interests and needs. Secondly, the researchers here found that any form of mobile learning language content should be kept to a minimum with small, "bite sized chunks" being most preferred. Students may loose interest if contents are too long or too complicated, but remain interested if they are kept to more manageable sized chunks. They also found that any request by the teacher or class goals to participate in mobile learning projects may require some form of inducement or incentive to be offered to the student.

Wang and Smith also concluded that many of the students in their study are not willing to make the clear distinction between mobile technology for personal use and mobile technology as a tool for learning. Smartphones are a powerful tool and very useful for learning. In this study it was concluded that students view their mobile phones as their private domain which should remain disconnected from formal study. According to Wang and Smith, “The distinction is clear: many students accept the concept that learning should be done in class or on a PC, whereas mobile phones are for their personal affairs” (2013,p.129). They later continue that to change this perception of using a private tool for formal study may require a shift in thinking as well as teaching. It is my goal in this thesis to demonstrate that mobile technologies can be used as a tool for formal study. Not only this but also to confirm that with sufficient empirical evidence students’ perception of their smartphones as a powerful learning tool can be completely changed.

2.4.2 Blended Learning in Foreign Language Learning

Several previous comparative studies have highlighted the influence of technology on the foreign language learner regarding vocabulary retention. Hirschel and Fritz (2013), carried out a study to compare the short and long-term effectiveness of two popular learning approaches very similar to this one, learning vocabulary with paper based vocabulary notebooks and a Computer Assisted Language Learning (CALL) programme with spaced repetition. Spaced repetition is a learning technique commonly used in online-based language learning tools that incorporates increased intervals of time between subsequent reviews of vocabulary items learnt. This principle is used in many learning contexts but is well suited to vocabulary acquisition in the course of second language learning. Their study concluded that very similar statistical significant gains were made in both groups, in terms of increases in vocabulary scores, however the CALL group ‘performed slightly better’ (2013, p.639).

2.4.3 Digital Flashcards

Further studies by Nakata (2008) attempted to highlight the difference between vocabulary gain between written word lists, paper based flashcards and digital flashcards using CALL based learning tools in a group of 217 Japanese high school students. Nakata's CALL based component of his study measured students' vocabulary acquisition by testing a predetermined number of correct responses to vocabulary items and their correct translation in the first language (L1) of the learner using paper based and digital flashcards. Results for this study were inconclusive and did not show digital flashcards to be superior to paper-based flashcards.

Overall there seems to be a lack of physical data to prove the advantages that computers can provide the foreign language learner with. Nakata (2008) claims that empirical evidence of the benefits of computers in language learning is still scant (2011). Nakata refers to a similar study he carried out in 2008 whereby students learning words in two different ways were compared, one with analogue paper flashcards and the other with digital online flashcards. Results showed that word lists were generally inferior to word cards and inferior to computer aided learning. The results of Nakata's study (2008) did not show unequivocal results indicating that word cards were superior to analogue word lists as had been expected.

2.4.3.1 Other Digital Flashcard Tools

The emergence of several popular digital flashcard tools have only recently released smartphone applications that are synched with their web based versions. Several such online tools are Anki, initially debuted in 2006, released its first mobile application in 2014 (Anki, 2014). Supermemo, another similar tool initially released its first smartphone application in 2013 (Supermemo, 2014), whereas Quizlet launched in 2007, released its inaugural android and iPhone compatible mobile application in

September 2013 which is directly synched with users online account. As such, very little literature exists in the field of lesson study or foreign language education.

2.4.4 Vocabulary Acquisition

As was reported by Hirschel and Fritz (2013), Laufer (2003) estimated that to truly learn 108 words from context, second language learners must read approximately 200,000 words, both an unrealistic and ineffective manner of vocabulary study. Similarly, Paul Nation, a well-known researcher in vocabulary acquisition, states that to guess the meanings of new words through context, learners need to understand 98% of surrounding words (2003a).

Nation (2003a), highlights the importance that the L1 has in understanding new vocabulary items in the L2. He declares that there are several ways foreign language learners can convey meanings of unknown words. He states that these ways 'include a definition in the second language, a demonstration, a picture or diagram, a real object, L2 context clues, or an L1 translation' (2003a, p.3). Until recently such methods combined in the computer and smartphone application formats were not possible. Nation also (2003b) claims that the priority of beginner to lower intermediate level learners is to build a survival vocabulary as quickly as possible. If students have grown tired of the traditional methods of learning vocabulary, providing an alternative and modern approach may be the impetus that such students require.

The current onset of technology has brought about a huge volume of literature on the topic of blended learning. Hall and Knox (2009) identify the expansion in online learning and blended learning methods. Although research in distance, online language learning and blended learning has increased, Shelly, Murphy and White (2013) declare that "there has been far less research devoted to language teacher education through this medium" (2013,p.560). This highlights the need for more

research in the foreign language education paradigm and proof that a blended learning concept can be successful and benefit both students and teachers alike. This thesis hopes to fill this void.

The study by Shelly, Murphy and White explores the ways in which language teachers across the globe have incorporated technology into their teaching and how they have responded to the challenges and developed their practices in the transition from classroom to distance, online and blended teaching. However, there is a distinct focus in their paper on “teacher cognition” rather than ‘teaching practice’. Shelly, Murphy and White declare that the cognitive beliefs of teachers control their actions and if given the chance to integrate more technology into their teaching regime they can improve their skills and the learning outcomes of their students (2013).

2.4.5 Teacher Cognition

Teacher cognition research is concerned with understanding what teachers think, know and believe to be the best way to teach. Borg (2006) outlines teacher cognition research as being concerned with what teachers do, think and know, and how their knowledge and practice develops. Reference at this stage is also made to the influence that language learning experiences can have on teachers and their pedagogical styles. Brookfield (1995,p. 49) in Shelly, Murphy and White (2013) declares that “the most significant and most deeply embedded influences that operate on us are the images, models and conceptions of teaching derived from our own experience as learners”. This notion echoes a similar sentiment by Stitt-Gohdes, (2001,p.136) who claims that "Research supports the concept that most teachers teach the way they learn". Shelly et al posed the question: How important are previous experiences when making the transition to a Blended Learning approach? These comments claim that many teachers may not feel comfortable using current

innovations to teach with. Although technology can facilitate learning in all these ways, it can also hinder learning. As Warschauer (2011,p. …?) points out "Computer breakdowns, network problems, dead batteries, or learning curves can all eat up class time which could be well used for other activities." This next section will now observe literature with a critical stance on technology in education.

2.4.6 Criticism of Technology and Learning

Thomas and Reinders (2012) claim that there has been a history of introducing learning technologies in education. They indicate that the frequent emergence of new methodologies and technologies are tagged with the label, `revolutionary` or `transformative`. They assert that these innovations may stem from origins outside of the learning context and often with commercial rather than pedagogical interests from large institutions passing from interest, to excitement and then disappointment and perhaps eventually abandonment as the `new` learning technology emerges. Kenning (2007) argues in this respect in relation to language learning, *'while technological progress has affected the way in which subjects are learnt and taught, it has not initiated paradigm shifts'* (p.165). It has also been realized in the literature that even though digital technologies may provide the opportunity to transform teaching now more than ever before, decisions made at tertiary institutions may resist the types of changes that are necessary. It is important to note that criticism towards introducing new technologies into the classroom will be met and may be more problematic for some depending on the institution at which they are employed.

The main point in this argument is that technology alone does not revolutionize pedagogy. Without a sufficient understanding and interest in how the new technology works by the teachers who intend to use it to educate and benefit their students, there may be little point in introducing it at all in the first place. Understanding of new

techniques and technologies takes time, for some people more time than others. However, if teachers are willing to take the initiative to learn how to use new technologies individually or if institutions can provide the support for this to be possible then the possibilities for autonomous learning of students beyond the boundaries of their classrooms will inevitably increase.

2.4.6.1 Animosity Towards Technology

Another valid argument as pointed out by White (2007) is that teachers may feel a degree of animosity and discomfort when new or emerging technologies are introduced that they are obliged to incorporate into their teaching techniques. When faced with this scenario teachers may loose confidence and opt not to use technology at all.

Similarly Prensky (2012) in his most recent publication aptly named "*Brain Gain: Technology and the Quest for Digital Wisdom*" states that there may be further criticism as we continually rely on digital devices to acquire information. In the age of digital machines, when more and more information is at our fingertips there may be no need to use the human brain. As technology develops we may constantly depend on our devices to answer our questions and entrust the instant response that they provide. This constant use of artificial intelligence may be diminishing our own ability to think.

There will continue to be constant criticism of technology in education with some common arguments being that what it has provided us with is not brain gain, but brain loss. Prensky states that the dispute is that technology is making us less able people, making our lives less "human" and less worthwhile. Prensky continues that this is happening because technology makes 'many things easier". However, according to Prensky technology can suppress the critiques by declaring that:

"those of us who choose to fully engage with technology are becoming freer, more productive, more creative, and more capable people, and, I believe, wiser people."

(Prensky, 2012:p.10)

2.4.6.2 A World Without Books

An article written by Marc Prensky written in 2011, although highly criticized, was published in the Chronicle of Higher Education in 2011 titled: "In the 21st-Century University, Lets Ban (paper) books". In this article, Prensky (2011) refers to recent news that South Korea had planned to digitize its entire primary and secondary school curriculum by 2015. Prensky also refers to data released from Amazon, the largest seller of books online, who announced in 2011 that they are selling more e-books than printed books. He poses the question "Which traditional university campus will be the first to go entirely bookless?" Prensky envisions a world without books a necessary transition that we can expect in the not so distant future.

2.4.7 Mind Evolution

Prensky (2012) offers the idea that rather than stunting the mind, by combining the complex reasoning abilities with technology`s strengths in storing and processing large amounts of data, conversely technology can make us wiser. Prensky claims that the symbiotic combination of the human brain and technology has great benefits for our own cognitive functioning. The cognitive impetus, which he believes has, and will continue to evolve human cognition, through digital wisdom he refers to as `mind evolution` (2012:p.11). The altercation here is that the symbiosis of human and machine is better, and wiser, than the human or the machine alone. Put concisely, technological enhancement is extremely positive for all of humankind.

2.4.7.1 The Role of the Teacher

One criticism of the concept of autonomous learning through blended technologies is the role of the teacher. One commonly asked question is: Will the teacher be needed if students become completely autonomous? Selwyn (2011) argues that several critiques suggest that the further improvement of digital technologies in the classroom and the promotion of autonomous learning may lead to the disappearance of the teacher altogether. It is unlikely this will happen. Selwyn declares that instead, it is perhaps more likely that teachers will continue to play an integral role in education and learning, whether technology-based or not.

The value of the teacher in encouraging autonomous learning, through a blended learning concept, cannot be underestimated. Without a teacher present in a blended learning curriculum, the course would not be blended. The authoritative role that teachers can continue to play in educating, informing, managing, facilitating and directing the technological activities of learners is paramount to success. It is the teacher's job to encourage learners to become autonomous and to change their approach to learning. Without the impetus of the teacher's input to initiate the goals or even as a helpful resource when things go wrong, learners may divert from their intended goals and lose track altogether.

There have also been many critiques of the general theory of blended learning. Oliver and Trigwell in Hinkleman (2012) critiqued the overall concept. They argued that the terms of blending technologies into a more traditional style teaching approach were `ill-defined and inconsistently used' and that the theory surrounding the approach was incoherent or redundant (p.2). This reference also confirms the relatively low volume of empirical data that suggests that blended learning is a theory in education that can produce effective results.

2.5 Technology Without the Knowhow

2.5.1 Saga-city ICT initiative 2014

There is a common misunderstanding that simply providing the most up to date technological tools to educators and their students is enough. Unfortunately providing the tools is only the first of many objectives and if course design is not implemented then intentions to drastically transform learning can come to a disastrous end all too soon. In Saga-city, Southern Japan, the local board of education implemented a plan in 2014 to introduce and promote ICT in high school to transform the way they students learn. As of April 2014 (佐賀県立高パソコン授業の惨状), the central prefectural board of education required every student to purchase a school-designed Fujitsu Arrows, Windows 8 tablet computer. The market price of this tablet was 85,000yen, but students were only required to pay 50,000yen, while the remainder was paid for by the city office. The idea was that every high school student in Saga would have equal opportunity to excel using technology to improve end results. However, according to RocketNews24 (2015) *"Saga Prefecture is in big trouble as technology in the classroom fails"*, the first few weeks of the project were riddled with problems. Some of the educational software wasn't working, the teachers were not trained in teaching with technology and the operating system was not as user-friendly as it could have been were just some of the many complaints received (hunter.investigate.jp, Feb' 23rd 2015). Also due to other technical issues, like poor Wi-Fi connections and battery power, many teachers complained that it often took up to 15 minutes to start the lesson. All these painstaking problems lead to the project being axed after just one year of commencement.

2.5.2 Insufficient Teacher training

There were several key problems in this case that needed attention. Firstly, very little support and guidance was provided to the teachers before the official

commencement of this project. Only short overviews and group tutorials were offered, which proved to be inadequate. Many teachers involved in the programme complained of not understanding the full function range of the hardware and its learning platform. Students were also ill-informed as to how to use their tablets appropriately which lead to further complaints. Two conclusions could be drawn from this failed ICT project. Firstly, it is imperative to properly train teachers in using and teaching with technology especially those who are more used to teaching with just chalk and a textbook. Once teachers have been trained it is then important to have a trial run of the technology being introduced where teachers can observe and learn the full functions of each tool providing feedback and the opportunity to communicate with each other before using it formally with the intended target audience.

Failure cases such as the one in Saga are fortunately not the norm as there are plenty of cases worldwide where the introduction of tablets coupled with extensive teacher and student training have been a huge success (Reid and Ostashewski, 2011, Kucirkova et al, 2014 and Bogart, 2012). However, the Saga-city case has emphasized the need for sufficient support, guidance and tuition for all who are involved if such a programme is to succeed. It is not the technology or hardware themselves that transform education, as Warschauer states "it will not be any particular device that transforms education, rather it will be how the teachers and learners make use of them that will" (2011, p.41). The project being implemented here in this doctoral thesis provides countless support for both the teachers and the students and highlights the value of guidance in such cases.

2.5.3 Interactive White Board Case in UK Primary Schools

In light of the experience of the Saga city board of education and the inadequate training that teachers received in the year 2014, further literature was found to back up

a similar notion in the UK when Interactive Whiteboards (IWB) were first introduced (Selwyn, 2011). In the year 2003 the UK Secretary of State for Education Charles Clarke (Arnott, 2014) started a UK Government initiative to promote ICT in British schools by introducing IWBs or more commonly Smartboards to all primary schools in England and Wales. According to Gillen et al, (2007) smartboards were initially introduced with the main goal of raising attainment through improving pedagogic practice. They stated that the "strong claims that the use of IWBs can 'transform' teachers' practice are made by both policy makers and manufacturers" (2007,p.244). However, there was little data to prove that they actually did this. Their study aimed to prove that during this period IWBs could in fact transform education when in fact results may not have met expectations.

2.5.4 Technology-Led as Opposed to Education-Led Initiatives

It was also explained by Gillen et all (2007) that it is often the case with ICT initiatives that emphasis is on the technology hardware which they term as "technology-led" and not on the education it is trying to transform, termed "education-led". Ideally ICT initiatives that are 'education-led', that is, initiatives that meet the professional requirements of the teachers' and the educational needs of the students in an improved way to what they are used to, should receive most attention. Unfortunately though, as in the Saga-city tablet and the IWB initiatives in primary schools in England and Wales this was not the case where both cases appeared to be technology-led.

Neil Selwyn published a title in 2010 aptly titled "Schools and Schooling in the Digital Age, a Critical Analysis" where he focuses on the use of modern technology in British schools. Although Selwyn states from an early stage that making the best use of digital technology in schools is irrefutable, "it is important to remain mindful of the symbolic role that technology often plays in discussions and debates over societal

change and improvement" (2010,p. 22). He continues by claiming that although schools may not be failing to make good use of technology often schools do fail to make the "best-use" of this technology and not using it to its full potential. One of the examples Selwyn refers to in this piece is also related to the installation of IWBs at a state run primary school in London, UK. Selwyn observed that although every classroom had been fitted with the most up-to-date IWB equipment all internet enabled, very few of the teachers were using the software and hardware to its full potential and some of them didn't use them at all. There were various reasons given for this, the most valid of which involved insufficient teacher training. Teachers were not given enough support to feel confident in using IWBs in their own pedagogy. This general "shunning of IWB use in schools" (2010,p.4) is just one of the reasons why digital technologies in schools may be 'not working' in the ways that many people believe that it should. He later declares that

"it should be clear to all but the most zealous technophile that the much-heralded technological transformation of schools and schooling has yet to take place" (2010, p.5). This thesis paper aims to contradict this statement by declaring that technology can have a positive effect on not only raising student and teacher awareness but also on improving overall ability in the foreign language context in Japan over a relatively short period.

2.6 Blended Learning Course Design

Integrating face-to-face teaching with new technologies in the classroom, may not be a new concept however, Neumeier (2005) argues that an ever-increasing hybridity requires that course design receives greater attention. Neumeier states that it is important that sufficient thought is given to course design when trying to implement elements of blended learning into a foreign language programme. Jones (2007) writes, that "it is useful for a course designer to think of an educational programme as a three-

part structure that operates on a micro, meso and macro level" (Jones 2007, in Hinkleman 2012:p.30). At the micro level the designer must contemplate the specific ability of the students in each particular classroom with consideration given to lesson plans and suitable class activities within the realms of learner's capabilities. Meso level course structure contemplates local or institutional guidelines that may alter the boundaries or learner goals. Learning outcomes and degree requirements might heavily influence course design at the meso level. While at the macro level, course designers must consider the effects that can be shown at the international, national or state level after the successful fulfilment of a blended learning course.

2.6.1 The Micro-Level

The micro-level of course design refers to the decisions made related to task design in the classroom. Tasks are the building blocks for lessons, especially in the context of language learning. Tasks in this context refer to the physical content of each lesson that a teacher sets, or tasks assigned to the student. Task design in the blended learning context, will promote the use of technologies in order to develop and enrich the learning experience of the learner and promote autonomous learning.

A task in this context according to Samuda and Bygate, (2008) is:

> *A holistic activity which engages language use in order to achieve some non-linguistic outcome while meeting a linguistic challenge, with the overall aim of promoting language learning through process or product or both (2008:p.69).*

Tasks can be carried out at the micro level with the help of educational online resources such as Blogs, podcasts, wikis, digital flashcards such as Quizlet or any other form of online teaching tool. It is the teacher's job in such an environment to

provide the ICT (Information Communication Technologies) knowhow to their students and show how each individual tool can aid their learning experience. Teachers require some skill and expertise with ICT in order to devise these kinds of tasks. The objective therein, is to initiate their use in class to promote autonomous learning by the student.

2.6.2 Meso-level

The main objective at the meso-level of course design is the consideration of institutional goals. Every educational institution inevitably has a list of `can-do` goals that each class group is expected to reach within the confinements of term time. It is these goals that must be considered and fulfilled at the meso-level of course design. What must be kept in consideration is the overall institutional policies and graduate attributes, faculty or departmental guidelines that an institution may expect from each course structure. Other considerations may include the time allowance of actual teacher time per week scheduled and the learner expectation that the institution may have for each individual student.

2.6.3 Macro-level

The main purpose of course design at the macro level is to observe the effects that a blended learning approach can have on the community or society in general. Such effects may include a different way of learning that can initiate a chain reaction of events in turn altering the way people live and learn. See Figure 4 below for a simple explanation of a blended learning course design.

Figure 4. Course Design Learning Process Model

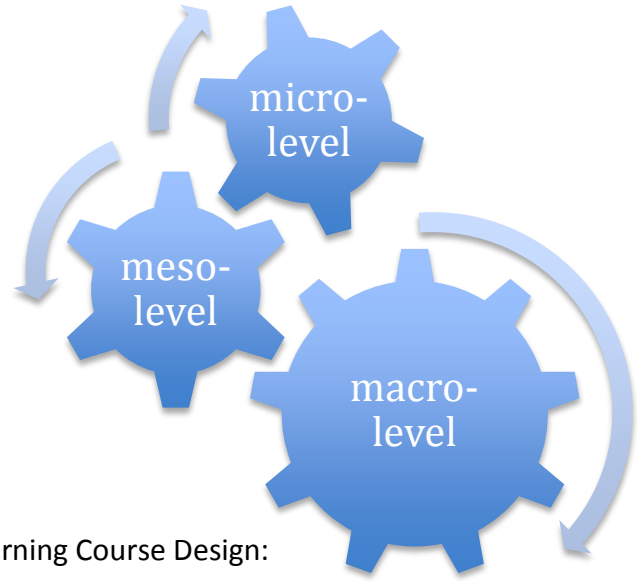


Table 1. Blended Learning Course Design:

1-Micro level	**3-Macro level**
Course design at the class level.	Change at societal level
Introduction of new modes of learning: - Online learning resources - Online dictionaries - Online flashcards – Quizlet - transission from analogue to digital - Collaborative learning tasks - Improved computer skills	Changes in: - Learning skills - Modes of thinking - Analogue to digital - Smoother transission to digital world - Learn through initiative - Passive to active learning - Improved confidence - Collaborative learning skills
2-Meso level	
Course design at the institution level.	
- Institutional goals reached - Completion of class syllabus - Fulfillment of “can-do” objectives - Completion of class requirements	

2.7 Gaps in the Research

As demonstrated in this section of the thesis there is a plentiful supply of literature available on the topics covered herein. This literature review has covered a wide area including technology in education, blended learning in foreign language teaching, learner autonomy, lesson study with regards to teacher training and course design. There is extensive literature available in each of these areas, however regarding the contexts and objectives of this thesis, several gaps in the literature were identified.

This ending section of chapter 2 will identify which sections of the literature discovered focus on and establish any gaps in that field.

2.7.1 Technology Gaps in Education

This section of the thesis is by far the most extensively covered area of all the topics mentioned within the confinements of this study. Some of the key figures who publish in this area include Mark Warschauer (2011) who established the wide benefits that technology can provide education in general, with a particular focus on school education in the US. Warschauer also is widely published in the field of CALL. He helped co-author a recent release titled *'Contemporary Computer-Assisted Language Learning'* (2014) which highlights CALL research in all its aspects. Prensky, the founder of the phrases "digital native, digital immigrant and digital wisdom" also widely referred to herein is widely known in the field (2001, 2010, 2012) and an earnest believer that technology makes us wiser. Similarly, Tapscott (1998, 2008) created the term "net generation" referring to the generation born after the initial mainstream introduction of computers and the internet in the 1990s.

There are also several critical references which highlight the negative impact technology is having on our lives referred to in this section. Selwyn (2010, 2011) published a critical analysis of the digital age in schooling and although an avid promoter of technology in education indicates the ways in which it is being misused. Morozov (2013) also provided a more comprehensive outlook on the adverse influence that the commercial side of technology is having on human nature with the book *"To Save Everything, Click Here".* Morozov states that retailers, innovators and producers of technologies in Silicon Valley are brainwashing us to buy the latest and fastest models each year which in effect fund their profit and further brainwashing. In general

there is plenty of other literature in this field not covered in this section which concludes that this area already has sufficient detail and very few, if any gaps.

2.7.2 Blended Learning in Foreign Language Education

There were three substantial gaps identified in the literature discovered in this section. The first of these gaps involved blended learning and available empirical data in the field to suggest that technology can positively benefit learners and augment ability. Although there is plenty of literature to suggest this, there is very little conclusive, empirical data that explicitly implies that technology can and does help. Nakata (2008, 2011) provided inconclusive results that vocabulary acquisition study, ability and test results could be augmented when comparing study with digital flashcards as opposed to paper flashcards. Similarly McLean, Hogg and Rush (2013) provided comparable results when conducting a study to measure the way second language learners learn vocabulary. Their study involved the use of a similar digital flashcard tool to Quizlet called Word Engine and measured gains in pre and post test vocabulary scores of those that used Word Engine and those that did not. Conclusions that were drawn from their study stated that test score differences between the treatment and control groups were not as large as expected. Hirschel and Fritz (2013) also made comparative studies between vocabulary learning with paper lists vs. digital lists but could only provide marginal data to suggest that digital lists outperformed analogue lists. These studies highlight the second research gap in the literature, an absence of studies centred around the use of Quizlet .

2.7.3 Quizlet Research

Several studies have been conducted on similar digital flashcard tools as mentioned above, but to the author's knowledge very little research exists on case-studies that have used the Quizlet digital flashcard tool to date. Vagas (2011) is one

of the few authors that refers to Quizlet in its primary stages. Providing empirical research data that can suggest that a blended learning tool such as Quizlet, can aid learners and encourage autonomous learning is one of the main objectives of this paper. The third and final gap of the available research refers to insufficient literature on blended learning in the foreign language level with regards to lesson study. Very few literature exists that make reference to Quizlet and the benefits it can have on foreign language learning. This thesis aims to clarify this area of literature and provide evidence that the use of Quizlet can be a constructive addition to a test-based foreign language class.

2.7.4 Lesson Study Research on Blended Learning

Lesson study as a pedagogical theory where teachers learn collaboratively to improve their teaching technique and their students' ability is increasing in global popularity. Lesson study provides the ideal framework to train teachers and learners how to use technological innovations. Without the PDCA cycle that lesson study incorporates, which focuses on communication and feedback with the teachers and students involved, success would not prevail. The practice of lesson study has a widespread following at the primary level of education in Japan, where it was first founded (Takashi, Lewis, Perry 2013) and accepted as an internationally coveted pedagogy. However, there is as yet little research at the tertiary level in Japan and even less in foreign language education. Although widely referred to at the primary level there is very little research in the realms of 'lesson study' at the university level and even less in the area of blended learning.

Table 2. Gaps in the Literature

	Field	**Identified gap**
Gap 1	CALL	Blended Learning studies in foreign language learning that provides empirical, conclusive evidence of the benefits that technology can provide the language learner.
Gap 2	Vocabulary acquisition	Case studies with Quizlet and other digital flashcard tools to suggest their use can raise digital awareness and language ability in foreign language learning.
Gap 3	Lesson Study	Blended learning studies in the field of "Lesson Study" that can suggest gaps 1 and 2 above

There has been plentiful research to date on the advantages that technology can provide education, yet there is little empirical data (Nakata, 2011) to suggest that technology can actually benefit the student and teacher alike. This thesis aims to fill this research gap by clearly indicating through quantitative and qualitative data from students in this study that test scores can be enhanced through the help of technology. This thesis also aims to reassure researchers in the field of lesson study of the importance of teacher support and guidance especially when complementing course design with technological tools. Lesson study provides the valuable opportunity for teachers to communicate with each other and to provide feedback about improvements to their lessons which can not only benefit their pedagogical skills but also can transform the learning skills of their students.

2.7.5 Answering the Research Questions

By highlighting these gaps this study aims to answer the following fundamental research questions:

1. Can technology positively enhance test scores over one academic year in a group of beginner level university students?
2. Can the introduction of several online blended learning language tools raise awareness of technology and motivation to learn?
3. Does a blended learning addition to a test-based course encourage autonomous learning?
4. Can teachers show an improved awareness of adopting technology in class?
5. Can this study provide evidence of a change in student learning technique to influence education at the macro level?

2.7.6 Final Remarks

These questions address several key factors which can be measured with varying data collection procedures. However, these questions also address several latent constructs which can be difficult to measure without a well designed survey. The next section of this thesis will introduce the methods used to approach the data collection phases of this study. Each procedure will be explained in detail with the main objective of answering the research questions challenged. However, the most important point that this study is attempting to convey is that technology where appropriate can and does benefit the language learner in Japan. With detailed reference to a wide range of empirical data of both quantitative and qualitative formats the proceeding section of this paper will introduce the methods used to obtain this data.

Chapter 3 – Methods and theory behind the approach

3.0 Methodology

This study was conducted over the space of two years from April 2013 to January 2015 at a medium sized private university in Southern Japan. Data collection was categorized into two divisions, a pre-study and a main-study. The pre-study involved 485 subjects in 19 class groups, all enrolled in a test-based English language course. These subjects ranged in age from 19-22 years of age and comprised of four major faculties at the university. They were of varying year groups and abilities of English. The majority of data collection in the pre-study comprised of quantitative figures with a short section of qualitative data. However, the majority of data for the main-study comprised of 7 students taught in one class by the author of this thesis. All blended technologies that were introduced in the pre-study were of a relative simple nature and less varied. Whereas, online technologies that were introduced in the main-study were similar to those in the pre-study yet were far more varied and overall of a more complex nature. Both sets of subjects were enrolled in a test-based English class, the former an introductory test-based course and the latter an intermediate course. Course goals were similar for both groups, but methods within those classes differed. Methodologies introduced in this section will follow this order, first by explaining details of the pre-study and then the main-study.

3.1 Survey 1 (Pre-study)

The Pre-study was conducted over the space of one academic year from January 2013 to January 2014. The subjects of this study included a group of 485 students, ranging in class size from 8 students to 35 students per class. All of these students willingly enrolled for an introductory TOEIC course with the main objective being to increase test score for which they would be awarded a total of 2 credits. The average TOEIC score of this group averaged between 350-450 points in the official ETS

endorsed TOEIC test. This group was subdivided into 19 class groups who were taught by 11 teachers. The teachers were also involved in this study although to a lesser extent than the students. The main focus of this pre-study was on the students with the main objective being to measure improvements in test score and change in attitude, motivation and anxiety levels of English ability over two fifteen week semesters. This class met with their respective teachers once a week for 90 minutes in either a computer classroom or a regular classroom without computers.

During the first two months of this period all 11 teachers were introduced to the digital flashcard tool Quizlet. Teachers were then invited to attend 2 training sessions explaining the full functions and benefits that Quizlet can provide. Teachers individually met with the researcher at alternate intervals throughout the semester. Furthermore, the researcher was in constant contact with each individual instructor by email any time a question or query arose. Support was given where needed. None of the teachers or students had any previous experience with Quizlet or similar digital flashcard technology. The teachers were categorized into two groups. The first group, referred to from herein as group A, used a computer room installed with the Japanese version of *Windows 7* OS, to instruct students for two fifteen-week semesters. The second group, referred to from herein as group B, used a regular classroom, without any computer or overheads for one term, but then switched to a computer room in the second term, see Table 3 below.

Table 3. Initial plan

Year 2013	Semester 1*	Semester 2**
Computer Room	Group A	Group A
Regular Classroom	Group B	Group B

Table 4. Advised plan

Year 2013	Semester 1*	Semester 2**
Computer Room	Group A	Group A Group B
Regular Classroom	Group B	

*Semester 1 = fifteen weeks from April – July 2013
**Semester 2 = fifteen weeks from Sept' – Jan' 2013

The initial plan was for group B to be the control group and group A the experiment group, see Table 3, above. All instruction for the group B students would be conducted in a regular class without computers for both semesters while the A group students would use computer rooms. However, the curriculum committee of the said university deemed this unfair in a unified curriculum such as this one. They claimed that a comparative study would provide an unfair advantage to the experiment group, was against university policy and not appropriate research ethics. Mackey and Gass (2005) highlight the issue of research ethics in second language acquisition. One point that they make involves the issue of comparative research methodology where a treatment group may receive preferential treatment over a control group. In such cases the control group "*theoretically, could benefit less than a treatment group*" (2005, p.28). In alignment with international research ethics and under the jurisdiction of university policy where this research was conducted a change in plan was accommodated, as advised, see Table 4.

3.1.1 The subjects

There were 11 teachers and 485 students involved in the pre-study. Of the 11 teachers, 4 were Japanese and 7 were foreign, comprising of the following nationalities: US, UK, Australia and Canada. The gender of these teachers was also mixed and comprised of 7 males and 4 females. All of these teachers were experienced English teachers who had varied years of experience ranging from ten to more than fifteen years. The students were all 2nd year students or above enrolled in full-time study programmes in one of four faculties. All of these class registrants had willingly signed up for this class and chosen English over a preference of a different foreign language on offer at the university. This class was not a required class. There were two prerequisites for this class. The first one required students to sit a placement test and be placed at either beginner or intermediate level. The placement test results

were categorized into the following groups: lower beginner, beginner and intermediate. Students placed in the bottom level of this test were not eligible to register for this class. The second prerequisite was that students had successfully completed one year of study prior to this class. The demographics of the subjects can be seen in tables 5 and 6 below.

Table 5. Teacher Demographics

	Teachers	
		Nationalities
Male	7	US-3 people Canada-1 person UK-1 person Australia-1 person Japan-1 person
Female	4	Japan-3 people UK-1 person
Total	11	

Table 6. Student Demographics

	Students	
Male	294	(61%)
Female	191	(39%)
	Faculties of students	
Faculty of Economics	78	16.2%
Faculty of Literature	151	31.2%
Faculty of Law	123	25.4%
Faculty of Commerce	133	27.6%
Total	485	
	Age	%
18 years old	5	1%
19 years old	328	67%
20 years old	108	23%
21 years old	28	6%
22 years old or more	16	3%

This group of students was divided into two consecutive groups; the A group and the B group. The A group were instructed in a computer room for two fifteen week semesters from April 2013 to January 2014 while the B group were instructed in a regular classroom for one semester and a computer room for the second semester.

Each group comprised of slightly different faculty constitutions, see table 7 below for the demographics of the A group and the B group.

Table 7. Demographics for the A Group and the B Group

Gender	**Group A**	**Group B**	**Year 2**
Male	(171) 59%	(121) 62%	(225) 59%
Female	(119) 41%	(74) 38%	(156) 41%
Total	(290) 60%	(195) 40%	(381)
Faculties			
Faculty of Economics	(67) 23%	(11) 6%	(57) 15%
Faculty of Literature	(116) 40%	(35) 18%	(115) 30%
Faculty of Law	(107) 37%	(16) 8%	(79) 21%
Faculty of Commerce	0	(133) 68%	(130) 34%
Nationality of teachers			
	Group A	**Group B**	**Year 2**
	3- US 1- Canadian 1- UK	4- Japanese 1- Australian 1- UK	3- US 1- Canadian 3- UK

Both sets of students followed the exact same class syllabus with identical class 'can-do' goals and objectives. Table 8, below describes a rough outline of the class syllabus that this course followed. Emphasis in this thesis is not on the course content, but rather the methods in which students adapt to reach these goals. The methods by which each group was expected to achieve the class goals differed slightly.

Table 8. Course Syllabus

Semester 1 2013	**A Group**	**B Group**
Week 1	Pre-test (TOEIC Bridge)	Pre-test (TOEIC Bridge)
Week 2	Survey 1 (before) **Quizlet Tutorial**	Survey 1 (before)
Week 3-15	Class work	Class work
Semester 2 2013		
Week 16		**Quizlet tutorial**
Week 16-28	Course work	Course work
Week 29	Post-test and Review	Post-test and Review
Week 30	Survey 2 (after)	Survey 2 (after)

3.1.2 The course goals

During weeks 3-15 of the first term and weeks 16-28 of the second term students were expected to work though two class textbooks. The first of which was titled "Journey to Success" by Kurata and Thorpe, (2008). This textbook offers a test-based course that targets elementary level English learners. This text has 12 units each of which focus on varied themes. Within each unit there is a vocabulary, listening and reading comprehension section which mirrors a similar style to the official TOEIC test. This text was viewed as the class text and was covered during class time only. Very few homework assignments or blended learning was involved with this text. The second textbook was titled

"Reach Your Target for the TOEIC test" by Bramley and Kawai (2007). This textbook was to compliment the previous class book and offered a list of 35 grammar and vocabulary drills. Content from this text was to be primarily completed as homework assignments. The main objective of this class was to improve TOEIC test scores through these sources. Other course goals for this class were to expand English vocabulary, improve test taking skills and build on general confidence in English comprehension.

3.1.3 Course Evaluation

Evaluation criteria for this class were subdivided into 4 main categories, e-learning, class participation, homework assignments and finally an end of term test at the end of each semester. The e-learning component of this class comprised of a computer software tool by a company called ALC (reference). This software was funded by the institution where this study was conducted and comprised of a TOEIC e-learning tool which gives students as much contact as possible with the actual TOEIC test. The theory behind this tool is that it would help to maintain motivation and allow students to access its content autonomously. Unfortunately this was not the case as ALC content

for this course was only accessible on campus. Both groups of students were expected to complete their ALC e-learning goals outside of class time as homework. Students in the A group could come to class early to work on their e-learning goals, while those in the B group would have to use communal computer lounges on campus. Other elements of the course that were evaluated on included the volume of homework that students completed each week and in class tests that were conducted. There was also an end of term test that covered all material from both texts and the e-learning component of the course. Students were graded accordingly and awarded subsequent grades that reflected all of the above.

3.1.4 Vocabulary Learning Methodology and Learning Input

All students who were involved in this study had never previously had any experience with Quizlet or similar digital flashcard tools. However, most students in this large group will have had plentiful experience with paper-based wordlists, which have the target language on one side and a direct translation on the other. Many students in Japan can be seen using these paper based lists at certain times of year, often in the shape of small cards attached to a ring. Such paper flashcards are widely available in convenience and stationary stores nationwide. There are flaws in this approach as students may often have incorrect translations of keywords on their paper flashcards. As this style of vocabulary acquisition has no visual aid that can accompany the word item, it is easy for learners to make the mistake in choosing the wrong definition. Students often choose the first definition of a word they have looked up in a dictionary which may not be the intended meaning of the initial word.

The alternative process that digital flashcards offer is quite unique. Quizlet can not only provide a visual aid to all vocabulary items learnt in the form of an uploaded photo or a selection from those available on the Flickr database, but every word also comes

with a near perfect pronunciation tool. These two aspects are invaluable to the comprehension of new vocabulary.

The computer and mobile device are only carriers for keeping the lists of vocabulary generated, so is a notebook. However, a notebook can easily be forgotten or lost and make access to word lists very sporadic. Digital word lists on Quizlet can never be lost, as long as log-in details are clear, students will have access to their lists wherever and whenever they desire.

3.1.5 Student Learning Process

There was a large volume of new vocabulary items that students would come across during the completion of this course. Vocabulary acquisition played a major role in the learning process of the class. Students were expected to learn at least 15 vocabulary items per week from two sources. The main source of these vocabulary items was through the two class textbooks. The methods in which students created individual word lists varied quite differently with each group. The B group created paper word-lists in notebooks, which may have been liable to error and essentially only contained one-word translations then switched to digital versions in the second term. Whereas, the A group created all word-lists digitally, having the extra advantage of audio pronunciation and visual aids for almost every word created. Students also had access to teacher created word lists that were void of any spelling errors and were expected to review words from either list on a weekly basis using one of the four, review tools. Students in the A group will have had 4 months more experience of using the Quizlet digital interface and should be far more accustomed to it than those in the B group.

3.1.6 Differences in Learning Styles

Digital word lists are considerably more versatile and allow students to access, edit or review words autonomously through their mobile devices. All time spent on Quizlet is synched with all activity being recorded in one central location which all the teacher's had access to. Through the pronunciation and visual aid tools, errors are also far less probable. Paper based lists though required a more exerted effort to create and edit as notebooks had to be tangible and a conscious effort made to edit, review and create them. The learning process of vocabulary acquisition in the B group centred around paper-based word lists then transferred to digital lists. However, the learning process of vocabulary acquisition in the A group centred around digital based word lists with a far greater list of advantages. Through the increased exposure to computers that A group had compared to the B group, it was expected that A group students would use various other digital tools to aid their learning process. Several other online learning tools were introduced, but were not promoted or enforced in any way.

3.1.7 Methods of Data Collection

There were 3 main methods of data collection used in the Pre-study obtaining quantitative and qualitative data results. The first data collection method involved pre-test and post-test results. All students were required to take a one-hour long pre-test prior to the commencement of the course described above. This test was first conducted in week 1 (April, 2013) and then later repeated after completion of the course in week 29 in January 2014. It was expected that test grades would show an overall average in both groups. The second data collection phase involved a 50-itemed pre-survey conducted in week 2 by all students. All questions in this survey comprised of multiple-choice questions and took students on average 12 minutes to complete. All questions were written in Japanese then translated into English for the

purpose of this paper (Appendix 1). The same questions were then repeated again in week 30, the final class conducted in January 2014. However, an additional 3 questions were added which asked students to comment on their view of learning with computers, or specifically Quizlet. This pre-post survey method of data collection provided a large amount of both quantitative and qualitative data. Finally, the same post-survey used in January 2014 was used again with a separate group of students in the same course that completed in January 2015. This new set of data was compared to the original data of one year previously. All data for this study will be described and discussed in detail in chapter 4.

3.2 Survey 2 (Main Study)

The main-study of this thesis focused on one class. This was a year-long class that started in April 2013 and ended in January 2014 comprising of two 15 week semesters. The main objectives of this class were similar to that of the pre-study class, but one level higher. The content, both skills, discourse used and 'can-do' goals were all more advanced than that of the pre-study class. There were also a greater number of blended learning components involved in this course. As the class size was much smaller than the average 22 students per class for the pre-study, the instructor could focus a lot more attention on each individual subject, in theory allowing for greater gains and improvement.

3.2.1 The Subjects

The seven subjects in this course were all 2nd year students who had been placed at the intermediate level after completion of the placement test. All seven students were in the same faculty, but varied in English language ability. Three of these students were 19 years old while the remaining four were 20 upon the commencement of the course. TOEIC scores in this class ranged from 400-700 points. These seven

students showed remarkably higher levels of motivation than those in the pre-study. They met as a class once a week for 90 minutes in a computer classroom equipped with one computer per student installed with *Windows 7* OS. In addition to this, these students also met as a group with a different teacher for 90 minutes a week, making a total of 3 English contact hours per week. The first class had an emphasis on the TOEIC test and aimed to improve test-scores by raising vocabulary levels, confidence and general overall ability in listening and reading skills in English. The second class had an emphasis on business English with more of a focus on writing and speaking skills. The main-study focuses primarily on class content and improvement in the first class. Table 9 below describes the demographics of students in this class.

Table 9. Demographics of Students in the Main-Study (Survey 2)

Group		
Male	4	57%
Female	3	43%
Weekly Classes		
Intermediate TOEIC class	1	90 minutes in a computer room
Business English class	1	90 minutes in a computer room
Total English contact hours	3	3 hours in a computer room

Students in this class were introduced to a far greater variation of blended learning tools to promote autonomous learning. During each contact hour there was an emphasis on at least three online learning tools per class. Functions used within each tool became gradually more complicated as time progressed. During the first term of this course there was a fundamental focus on listening skills, while in the second semester the focus was more on reading skills. In a similar fashion to the pre-study, there were two class textbooks that constituted the class syllabus. However, there was also a certain volume of additional materials being used. Table 10 below describes the class contents in brief.

Table 10. Class Contents of Main-Study

Semester 1 April – July 2013	**Content**	**Data collection phase**
Week 1	Pre-test completion	TOEIC listening Pre-test
Week 2	Introduction to Quizlet and Wikispaces	TOEIC listening pre-test
Week 3 – week 5	Textbook	
Week 6	Presentation 1	
Week 7 – week 9	Textbook	
Week 10	Presentation 2	
Week 11 – week 14	Textbook	
Week 15	Presentation 3	
Semester 2 September 2013 – January 2014		
Week 16	Introduction to Mreader and Wiki-project	
Week 17 – week 18	Textbook	
Week 20	Wiki-project part 1	Survey 1
Week 21	Textbook	
Week 22	Wiki-project part 2	
Week 21-24	Textbook	
Week 25	Wiki-project part 3	Survey 2
Week 26	Textbook	
Week 27	Wiki-project part 4	
Week 28	Textbook review	
Week 29	Wiki-project part 5 TOEIC Listening test	TOEIC listening post-test
Week 30	TOEIC reading test	Survey 3 TOEIC reading post-test

After the initial introduction of the course during the first class students were informed that their progress and results would be monitored and their assistance would be required for data collection from time to time. All students kindly complied with this agreement. During the first semester students were all instructed to take the TOEIC test which was conducted in the first two classes of term. As the TOEIC test is so long, it was not possible to be completed in one class alone. The listening takes 45 minutes and the reading section takes 75 minutes to complete. Results for this test were used as the pre-test results. The same test was taken again in the same format in the final two weeks, weeks 29 and 30 respectively and used for the post-test results.

3.2.2 Learning *Input (Semester 1)*

After completion of the pre-test students were introduced to Quizlet and given a detailed explanation of all its functions in a similar manner to the pre-study. Students were expected to add 15-20 words per week from any source they liked. The majority of these vocabulary items came from two textbooks. The first text was titled: "*Successful Keys to the TOEIC Test 2*" by Mizumoto and Stafford (2009) a TOEIC based text that targets intermediate foreign language learners that are targeting the 600 point level. The other text used in this course was a drill workbook titled 'Reach Your Target for the TOEIC test 2" which provides vocabulary, grammar and reading comprehension drills in a similar format to those in the real TOEIC test. Students were further encouraged to supplement their word-lists with any other written discourse they came across in the learning process of this course. The first text consisted of a set theme for each unit with a listening and comprehension section based around this theme. These themes included, people, travel, technology, media, entertainment and business. There was an extensive array of vocabulary introduced by this method each week which students had to learn by adding to their Quizlet word-lists.

3.2.3 The Learning Process (Semester 1)

This semester involved the completion of three presentations all correlated to the collective themes introduced in class. A primary objective of the class was to improve on vocabulary through the various sources described above. The first presentation, held in week 5, centred on people, travel and technology. Students were given a selection of five topics from each section to choose for their presentation. Each presentation was to be a maximum of two minutes and had to incorporate a minimum of five vocabulary items learnt on that topic in class. The second presentation was held in a similar manner and combined the topics of entertainment, media and restaurants. The final presentation culminated with all the material covered in class so

far, involving the introduction of one global corporation of their choice. Students had to introduce various basic facts about this company including, the location of its headquarters, the size of its workforce, the annual turnover and other basic facts. The learning process involved detailed research of this company using English Internet pages. Students were further encouraged to use various translator tools such as popjiso.com (*popjiso*) which displays any webpage in the target language then illustrates the word translated into a base language of your choice. Any unknown vocabulary that was discovered in this process was to be added to student word-lists in Quizlet. The instructor checked Quizlet lists regularly and encouraged students to continuously review their word lists.

3.2.4 Learning Output (semester 1)

The learning output involved with this process involved oral presentations and any vocabulary acquired in the research process and fulfilment of weekly class goals. During regular class time, students were given plentiful opportunity to talk with each other about class tests and drills. During this process, classroom ethics were extremely positive, students also had access to each others Quizlet word-lists. All completed presentations were filmed during class and uploaded to a central location where students could collaboratively comment on each others' work. The online educational tool used in this case was called '*wikispaces'.* Videos were kept private and only accessible to people in the class.

3.3 Learning input (semester 2)

Learning input during the second term was quite different. The main focus switched from being listening comprehension in the first term to reading comprehension in the second. The transition was very smooth as many of the same software tools that were used in the first term were elaborated on.

Blended learning tools that had not previously been used in the first semester included simplenglishnews.com, newsinlevels.com and Mreader.org. All three of these educational tools focused on reading comprehension. Course content with regards to the textbook, simply progressed from where it left off in the first semester. However, the methods in which Wikispaces was used differed greatly. Wikispaces and Mreader played a major role in the learning process of the second semester. Firstly, students were required to create a 5 part self-constructed test termed the wiki-project. This test mimicked that of the real TOEIC test, but perhaps more importantly gave the students valuable advice in how to construct test questions and the ability to recognize and construct distractors. Table 10 indicates the 5 parts of this wiki-project.

Table 11. The Wiki-Project in Semester 2.

	REAL TOEIC		**Wiki-Project**	
Part 1	**10 Pictures with questions**	Listening	5 pictures and short questions	Reading
Part 2	**Question- answer**	Listening	5 pictures and long questions	Reading
Part 3	**Short talks**	Listening	5 videos and questions	Listening
Part 4	**Incomplete sentences**	Reading	Incomplete sentences	Reading
Part 5	**Reading passage**	Reading	Reading passage News from internet	Reading
TOTAL		200	TOTAL	25

Each part of the Wiki-project involved various levels of computer skills beginning with simple tasks and ending with more advanced ones. Students were shown how to commence each task during class time then instructed to complete each one as a homework assignment by the deadline. The instructor gave constructive feedback using the Wikispace review tools, highlighting errors or sections that needed revised. Students were then expected to make these changes and perfect their questions as

much as possible. The computer skills that were involved in this process included uploading photos, embedding videos, adding hyperlinks and giving constructive feedback to classmates.

3.3.1 Mreader

The Mreader tool also played a large role in the class objectives in the second term. Mreader.org is an online database of graded reader quizzes. Mreader contains a simple 10 question quiz which verifies the comprehension of a said book for a large volume of graded reader titles. According to the creator of this tool *“there are currently (November, 2014) over 4300 quizzes available, comprising virtually all popular graded reader series as well as "youth literature" -- books used with native-speaking children and young-adults* (Robb, mreader.org). Graded readers come in a range of levels with the shortest being around 20 pages or 600 words and the largest being around 140 pages 15,000 words or more (Robb and Kano, 2013). Mreader tracks the number of words read by every student by assigning words per title to every book quiz passed. There are various cheat mechanisms installed within this software making it very difficult for students to cheat the system and taking or passing quizzes for books they hadn’t actually read. Students were expected to read 50,000 words by the final week of class. This was further divided into 3 deadlines, by week 20 students had to read 15,000 words, by week 25 students had to read 30,000 words and by week 30 students were expected to have read 50,000 words or more to fully obtain the evaluative points for this module. Mreader was regarded as a blended learning tool as students could access their Mreader accounts via smartphones or any computer with an Internet connection. For more information see mreader.org.

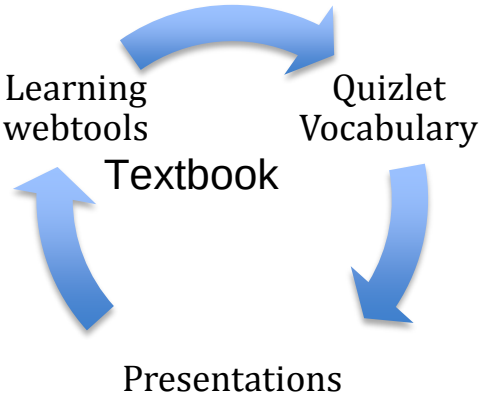
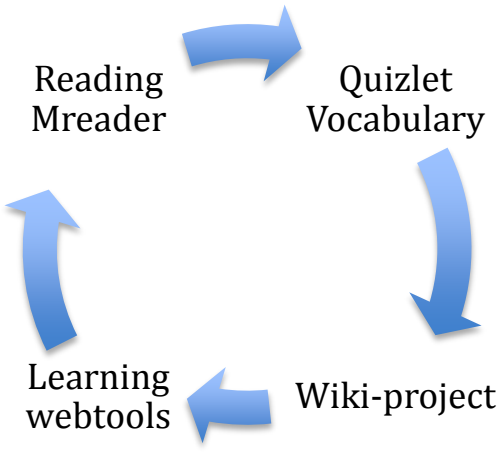
3.3.2 Learning Process (Semester 2)

The learning process for the main-study followed the popular PDCA cycle, of plan it, do it, check it and act upon it. Firstly students were guided in how to plan (Plan) questions for each particular part of the wiki-project test. This guidance involved demonstrations in how to upload pictures, embed videos and do other essential tasks in a wiki page. Students were also instructed how to create test questions and given examples of distractors and how to create them. Upon receiving this guidance students wrote their questions by the deadlines (Do). The next step involved the teacher thoroughly checking every question giving feedback where necessary. Students were expected to edit the changes in class (Check) and perfect their questions to the best of their ability (Act). During this learning process and throughout the general duration of the class, students were expected to be continuously adding words to their Quizlet word-lists.

3.3.3 Learning output (Semester 2)

The learning output involved a combination of different factors all described above. Firstly, there was the output concerning the production of student created tests with the Wiki-project. Secondly, there was a large volume of reading and written discourse with their weekly Mreader goals. Finally there was improved vocabulary retention through Quizlet activity. All members within the class had access to each others' lists making for a comprehensive and collaborative learning experience. Students also had plentiful opportunity to converse with each other in English during class, to exchange ideas and to view each other's work on their wikis. Figure 5 below describes in full the learning processes involved in each semester.

Figure 5. The Learning Process in the Main-Study

Semester 1		
Input	**Black-box**	**Output**
● Clear learning goals & objectives ● Quizlet flashcards ● Textbooks ● Online Blended learning tools		● Vocabulary improvement ● Gained test scores ● Confidence with technology ● Improved comprehension
Semester 2		
Input	**Black-box**	**Output**
● Mreader extensive reading ● Wikispaces.com Wiki-project ● Quizlet flashcards Vocabulary ● Textbooks ● Online Blended learning tools		● Interaction with classmates ● Increased TOEIC scores ● Confidence with English ● Improved comprehension ● Wiki-project completion ● Mreader goals completion

3.3.4 In conclusion

The pre-study and main-study of this thesis are separate entities. However, both correlate with each other to answer the main research questions of this project. An extensive array of data was compiled from these classes which will be discussed in detail in the following chapter. The main purpose of this collective approach of combining two datasets of differing blended learning courses was to realise the main hypothesis of this project, that technology and blended learning can benefit the foreign language learner in Japan. Table 11 below summarises the two studies that incorporated this thesis.

Table 12. Summary of Survey 1 and Survey 2

	Survey 1	**Survey 2**
What	One large group of students split into 19 class groups	One class group
Who	485 students split into: A group and B group A group – 290 members B group – 195 members	7 students
Where	A group learned with computers For two terms B group learned without computers for one term and with them for one term	
When	April 2013 to January 2014	
How	A group used digital flashcards B group used paper flashcards	
Blended learning	*Elementary level:* ● Quizlet flashcards ● e-learning tool ● Online dictionaries	*Intermediate level:* ● Quizlet .com ● Mreader.org ● Wikispaces.com ● e-learning tool ● simplenglishnews.com ● newsinlevels.com

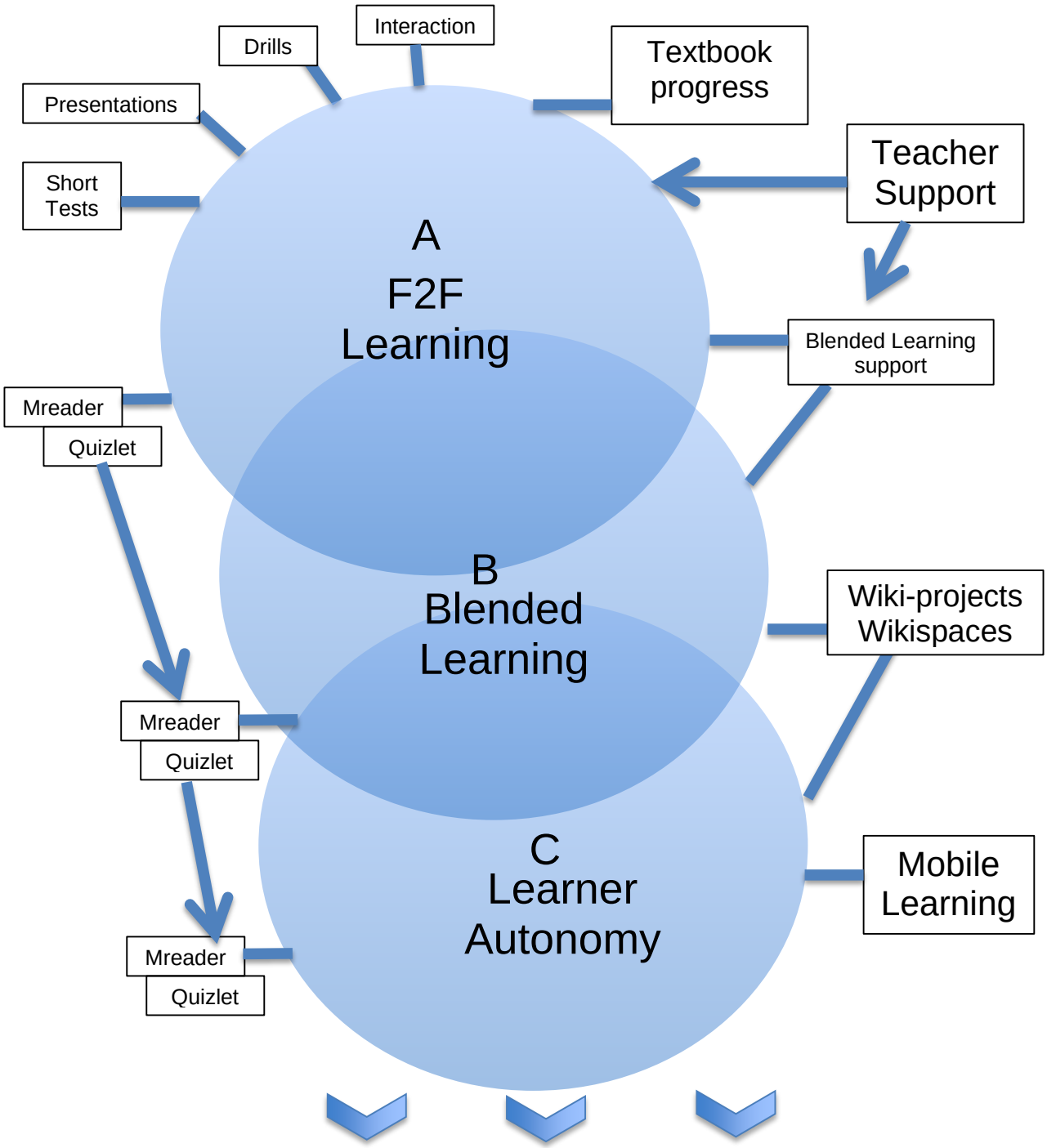
3.4 Theoretical Framework

The theory behind this study involves several key concepts outlined in figure 6 below. Primarily, the author proposes technology, in the form of several online learning tools, can assist autonomous learning in students. With the use of mobile smartphone applications and online technology, students can access, update and learn from individually created word lists independently or collaboratively using Quizlet . Students can also learn intuitively by creating and adding original material to their wikis online anywhere they have access to computers. Once formerly introduced and accepted, online and mobile technologies are then expected to enhance overall student motivation and through this compartmentalized paradigm, students' awareness and perception of technology can be enhanced and results improved. It is also expected that teachers involved in the pre-study will build on their professional development,

learn from each other and hopefully maintain an interest in the new learning methods acquired.

The following diagram (figure 6) describes the theory behind the intended research of this study in relation to the 5 research questions. All the research questions are listed below and categorized into the relative theory that they are addressing. The first question addresses student test-scores and overall ability, while the second addresses student attitude towards learning with technology:

Figure 6. Theoretical Framework



The above framework involves the three main concepts of:

(A) F2F class room instruction: students will be instructed in a classroom setting. Students will be informed of how to complete the class goals in an alternative manner to what they may be used to incorporating learning styles that may be new to them.

(B) *Blended Learning: Refers to the time and effort students put in to their studies out of class (C) using new technologies introduced in A.*

(C) *Learner Autonomy: students will indepently work towards a similar goal outwith the constructs of the class. Students will be informed of how to use new technologies introduced in class to reach their goals autonomously. Any technological support to promote further autonomous learning will be received in A.*

Task completion during F2F class time can help to encourage and promote the use of blended learning tools at the micro-level of course design. If students receive sufficient support and tuition during class goals and objectives can be met at the meso-level. If students take this learning experience and further develop their learning skills independently, change can also occur at the macro-level. Through the precise implication of a blended learning component, data will hopefully suggest that student test scores and comprehensive ability can be augmented.

3.5 Research Questions at the level of course design

Table 13. Research Questions at the Course Design Level

	Question	Course -level
1.	To what degree can technology positively enhance test scores over one academic year in a group of beginner level university students?	Micro
2.	Can the introduction of several online blended learning language tools raise awareness of technology and motivation to learn?	Meso
3.	How can a blended learning addition to a test-based course encourage autonomous learning?	Meso
4.	Can teachers show an improved awareness of adopting technology in class?	Meso
5.	How can this study provide evidence of a change in student learning technique to influence education at the macro level?	Macro

Chapter 4 – Results

An extensive array of data was obtained for this study from both the pre-study and the main-study. The majority of results from the pre-study provided quantitative data which was extensively analysed using the most up-to-date software tools. A small amount of qualitative data was also retrieved from the pre-study which was analysed in accordance with the most modern methods available. Due to the limitations and constraints of the main-study with the much smaller group, the principal focus of results was on qualitative data. Table 13, describes the data retrieved from this study.

Table 14. Results Overview for Survey 1 (Pre-study) and Survey 2 (Main-study)

	Week & Date	**Test**	**n**	**Quantitative Data Collection**	**Qualitative Data Collection**
Survey 1	1 April 2013	Before	n=455	Pre-test – 100 question TOEIC Bridge test	
	2 April 2013		n=408	Survey 50-Items	
	29 Jan' 2014	After	n=372	Pre-test 100 question TOEIC Bridge test	
	30 Jan' 2014		n=333	Survey 48-Items	2-Items
Survey 2	1 April 16th 2013	Before	n=7	Pre-test – 100 question TOEIC test	
	20 Oct' 23rd 2013		n=7		Post-survey 8 items
	25 Nov' 27th 2013		n=7		Post-survey 8 items
	30 Jan' 15th 2014		n=6		Post-survey 8 items
	30 Jan' 15th 2014	After	n=6	Post-test – 100 question TOEIC test	

Through this study an extensive array of data was obtained from three sources. The three sources included the student subjects of the pre-study, their respective instructors and finally the students involved with the main-study. Results will be introduced in this order.

4.1 Pre-study results

A fifty-itemed survey was constructed and conducted in the first week of the pre-study, from April 12th – 18th 2013 using the online survey tool Surveymonkey (www.surveymonkey.net). The survey consisted of a series of questions, categorized into 5 factors. These factors were subjectively organized by factors created by the author without the use of an advanced statistical tool. All results were collated in a simplified format and again using more advanced calculations. The first procedure involved basic techniques by averaging results for each item under each subjective and consecutive factor with Microsoft Excel. The second technique used more scientific calculations using the well-known statistical tool SPSS by IBM. Results will be introduced and discussed in this order.

Table 14 shows the five subjective factors used. All of the data from this initial source referred to below, were retrieved from questions administered using a six-point Likert scale. An even number of Likert-scale options was chosen at this point to avoid students "sitting the fence" avoiding any neutral answers where possible (Brown, 2000). From this six-point scale a positive answer was either 4 or above, while a negative answer was 3 or below. Table 14 shows the Likert scale used for all quantitative data constructs in the pre-study and main-study. Appendix 1 shows all items used in this survey.

Table 15. The Six-point Likert scale used for Survey 1 and Survey 2

1.	I strongly disagree	Negative
2.	I disagree	
3.	I somewhat disagree	response
4.	I somewhat agree	Positive
5.	I agree	
6.	I strongly agree	response

Table 16. Factor 1 – Factor 5 Pre-Survey

	Factor	**Questions**	**Total**
F1	Attitude, interest and motivation towards learning English	Qs. 9-22	14
F2	General computer usage	Qs. 23-24	2
F3	Computers and English learning	Qs. 31-36	6
F4	Technology and learning	Qs. 42-47	6
F5	English and Lifelong learning	Qs. 48-50	3

Date conducted:
Week 1 – April 12th – April 18th, 2013 & week 30 January 16th – 22nd, 2014

The remaining 19 questions were either not applicable for data analysis or did not fall under the Likert scale format.

4.1.1 Student Survey Results

Results for the pre-study were subdivided into the corresponding A groups that were instructed with computers for thirty weeks. The B group were instructed without computers for fifteen weeks and with them for thirty weeks. Average scores, ranging from 1 "strongly disagree" to 6 "strongly agree" were calculated for each group and each factor. The average score for constructs related to Factor 1, '*students' attitude, interest and motivation towards learning English'* (F1), comprised of the average Likert score from 1-6 that all students chose for question 9 to question 22. Table 16, shows the sample size and denominations for each group. The following set of graphs show the average scores for each group with the data shown for each factor clearly marked to two decimal points.

Table 17. Sample Size Variation

	Pre-survey			Post-survey*		
	A	B	Total	A	B	Total*
Sample size	n= 229	n=179	n=408	n=222	n=100	n= 322
Male	n=134 (59%)	n=111 (62%)	(244) 40%	n=123 (55%)	n= 61 (60%)	n=184 (57%)
Female	n=95 (41%)	n=68 (38%)	(164) 60%	n=99 (45%)	n=39 (40%)	n=137 (43%)

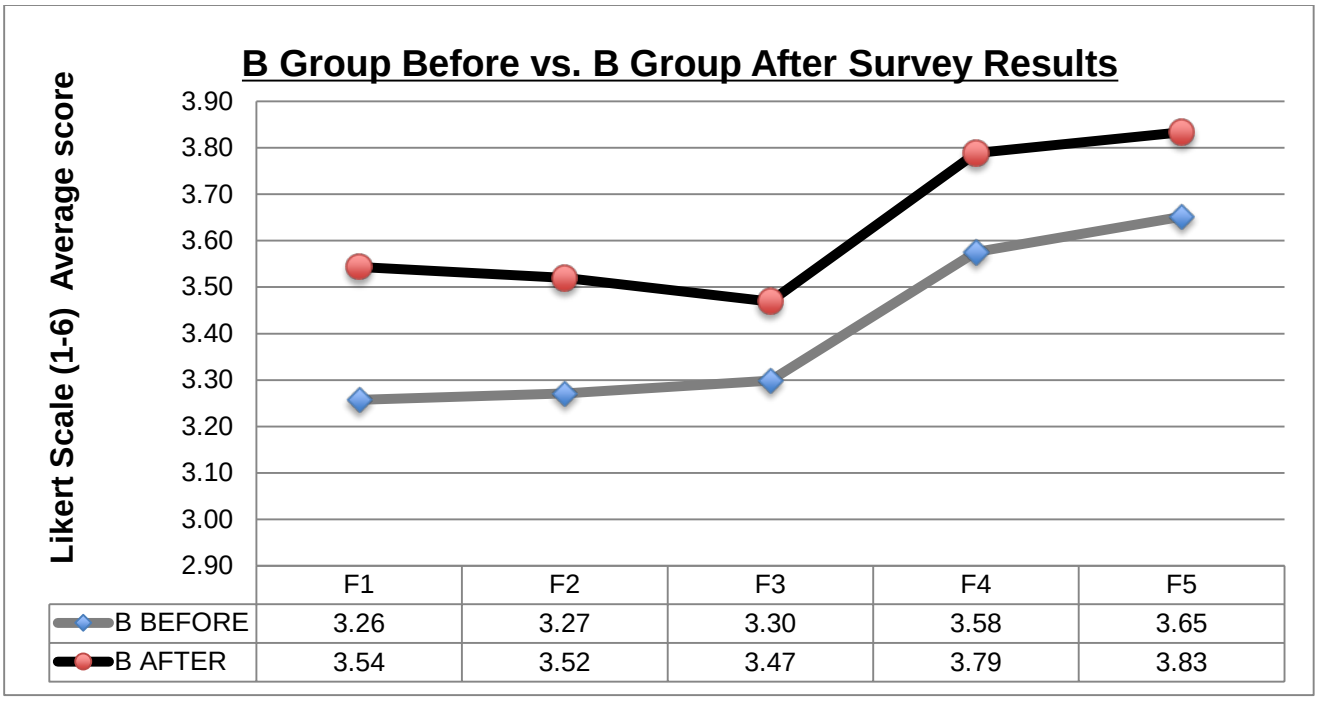
*The "After results" had a third group, group C who did not use a computer class in either semester. All results for this section were deleted, as they were not applicable for this study hence a lower sample size.

Results of survey 1 (phase 1)

Figure 7. A Group Before vs. A Group After Survey Results

A Group Before (n=229), A Group After (n=222)

Figure 8. B Group Before vs. B Group After Survey Results



	F1	F2	F3	F4	F5
B BEFORE	3.26	3.27	3.30	3.58	3.65
B AFTER	3.54	3.52	3.47	3.79	3.83

B Group Before (n=179), B Group After (n=100)

4.2 Discussion of Quantitative Results

When comparing the before and after survey data for both the A and B groups (Figures 7 and 8), collated averages for the after group almost always showed higher scores. The most significant of changes received were when comparing the A group before and after results in Figure 7. These results indicate that student perception of technology has shifted slightly to a more positive direction. Results for F1 (attitude and motivation) in the A group showed barely no change at all, however results for F2 and F3 showed significant gains, while those for F4 and F5 showed slight gains. These are very positive results, the significance of which will be discussed in more detail later.

A similar trend was noted for the results in figure 8, comparing the B group results before and after this study. The largest change in this section was for F1 (Attitude and motivation towards English). The introduction of technology and the blended style of learning seems to have had a positive impact on the students in this group. One other

point to mention at this stage concerns the overall smartphone ownership in this class. The first round of data collection showed that there was an overall 88% ownership of smartphones, this number increased to 93% in the after data for the group as a whole. The onset of this course and the use of Quizlet via mobile devices in class may have caused some students to upgrade their mobile phones. An increase of 5% over such a short period is substantial, nevertheless, whether this study impacted on that decision cannot be verified.

4.2.1 Anomalies

A close comparison of the above data shows varying sample sizes for the A group before, after and respective results for the B group. There are several simple reasons for this. Following academic protocol, all students had to give consent to taking both surveys. In the first survey bout, 10% of the students did not give consent and in the second survey session this number rose to 20%. Over the duration of this course, when comparing the registered students (485) to the actual number of students who completed the course (415) there was a 15% reduction in numbers. Furthermore one teacher involved in this lesson study had an aversion towards computers and decided that teaching in a computer class was beyond her abilities. This teacher returned to a regular classroom after week 2 and all data for that class was annulled and removed from the final set of after data. All of these factors have collectively resulted in a 20% lower sample size in the after results.

4.2.2 T-test and p-value significance

To further statistically highlight the significance of this data, a paired t-test was carried out to compare the pre and post surveys of each individual group. Firstly, data was categorized into their corresponding A group and B group datasets. Then each group was split into a further 5 groups before (F1-F5) and likewise for their

corresponding after-groups. Thereafter, the average data results for the A group before, were compared to the average data results for the A group after. The same was carried out for the B group data. The A group dataset, was not compared directly to the B group dataset. In table 17, below the column marked “pair set” refers to average data for all answers to Factor 1 constructs before (F1B), and all answers to Factor 1 constructs after (F1A). The following t-test results explain the difference in sample size and statistical significance between the graphed data above.

Table 18. Paired T-test Results for Averages Before and After

	Pair set	**t-score**	**Significance**
A Group	A-F1B - A-F1A	-.094	.925
	A-F2B - A-F2A	-2.767	.006
	A-F3B - A-F3A	-2.077	.039
	A-F4B - A-F4A	-1.265	.207
	A-F5B - A-F5A	-1.037	.301
B Group	B-F1B - B-F1A	-3.287	.001
	B-F2B - B-F2A	-1.995	.049
	B-F3B - B-F3A	-1.619	.109
	B-F4B - B-F4A	-1.966	.052
	B-F5B - B-F5A	-1.761	.081

In scientific terms any number higher than 0.05 (5%) is not determined to be significant. All significant datasets have been highlighted in grey. With the A group of subjects, there was a high significance between Factor 2 and Factor 3 constructs. F2 refers to ‘general computer usage’ and provided a p-value of 0.006, 0.06% probability that they were insignificant while Factor 3, comprising of 6 constructs on ‘computers and English learning’ provided a p-value of 0.039 or a 3.9% probability that the before and after data are insignificant. This emphasizes the positive effect that a blended learning component can have on the way foreign language students use computers to learn English stating that student opinion towards these constructs has changed with time. Prominent data from the B group included Factors 1, 2 and 4. The p-value of F1, which asked for student opinion on ‘attitude, interest and motivation towards learning English’ comprised of 14 constructs. Results for F1 before and after in the B group

were 0.001, a 0.01% probability of insignificance. This emphasizes the significance between students from the B group before being introduced to a blended learning test-based curriculum, and to their altered opinion after. Alternatively, this number declares that the change introduced to this group was highly significant in influencing over all opinion towards student's motivation, attitude and interest in general of learning English. Other outstanding p-value data can be seen from F2, which resulted in a p-value of 0.049, or 4.9% chance that this data is random and F4 with a p-value of 0.052, a 5.2% chance. Factor 2 refers to 'general computer use' and comprised of just 2 constructs, while F4 referred to 'technology and learning' and comprised of 6 constructs. Results for F2 and F4 respectively show that blended learning components introduced to the B group have significantly influenced student opinion to the benefits that computers and technology can have on their learning. All other p-values recorded from this t-test were too insignificant and cannot be scientifically conclusive from these results.

4.3 Statistical Analysis of Pre-study

After a closer inspection of the quantitative data retrieved for the pre-study it was decided a more in-depth statistical analysis was necessary. Various forms of statistical analysing software were used to address the research questions and highlight any changes observed from the before and after survey strategy that was adopted with this study. All data will be presented in consecutive order starting with the before (pre-survey) results of the pre-study first, followed by the after results (post-survey). Results for the third phase of results will also be presented. See table 18, below for the statistical analysis order of results.

Table 19. Order of Statistical Results for Pre-Study

Order	Pre-study	n	Statistical tool	Software
1	Before (pre-survey) Quantitative	n = 409	Factor Analysis Correlation Efficient	IBM SPSS
2		n = 409	Path Analysis	IBM Amos
3	After (post-survey) Quantitative	n = 333	Factor Analysis Correlation Efficient	IBM SPSS
4		n = 333	Path Analysis	IBM Amos
5	After (post-study) Qualitative	N = 381	Textmining	Wordminer
6	Pre-test vs. Post-test	n = 372	P-test and t-test scores	IBM SPSS
7	Phase 3, year 2 (post-survey)			
8		n = 381	Path Analysis	IBM Amos
9			Text mining	Wordminer

4.3.1 Factor Analysis of Survey 1 Combined Data

SPSS was used to analyse all data for survey 1 with a sample size of 409 subjects from both groups A and B. The following set of results shows the factor analysis figures from the first phase of data collection.

Table 20. Factor Analysis Combined Group Score – Before (Survey 1)

	Factor					
	1	2	3	4	5	6
Item47	.838	.133	.091	.036	.079	.102
Item45	.829	.077	.089	.039	.133	.102
Item44	.774	.087	.089	.028	.119	.081
Item42	.773	.113	.163	.056	.233	.092
Item46	.761	.131	-.077	.118	-.015	.167
Item34	.758	.197	.195	.155	.060	-.085
Item33	.751	.131	.223	.139	.194	-.131
Item23	.696	.156	.130	.063	.137	-.022
Item43	.640	.113	.100	.124	.174	.040
Item36	.570	.143	.280	.021	.262	-.011
Item35	.502	.282	.124	.262	-.094	.069
Item16	.097	.738	-.009	.000	.080	.066
Item17	.168	.681	.240	.130	.114	-.096
Item18	.055	.633	.213	.181	.103	.083
Item13	.078	.586	.079	.015	-.011	-.089
Item11	.169	.586	.403	.184	.037	.011
Item15	.181	.536	.345	.040	.226	.021
Item12	.170	.447	.142	.012	-.040	.046
Item50	.288	.421	.167	.108	.049	-.009
Item48	.239	.310	.644	.275	.157	.032
Item14	.187	.476	.528	.249	.085	-.063
Item49	.294	.155	.524	.131	.267	-.058
Item10	.107	.329	.447	-.034	.126	.126
Item9	-.041	-.169	-.412	-.004	.085	.003
Item31	.219	.044	.077	.688	.105	-.093
Item32	.157	.218	.147	.686	-.034	.059
Item21	.237	.122	.030	-.017	.625	.045
Item22	.205	.048	.100	.066	.613	-.070
Item19	.004	.085	.048	.073	.133	-.600
Item20	.211	.135	.106	.061	.172	.459

The results here state that six factors were discovered at this stage. The column on the left refers to the construct item number in the survey while the highlighted sections indicate the limits of each factor. These factors directly correspond to the survey items in Appendix 1. The following labels were given to each factor.

Table 21. Factor Labels for Pre-Survey Combined Data

	LABEL/NAME	Items
F1	Computers and technology in English learning	23, 33, 34, 35, 36, 42, 43, 44, 45, 46, 47
F2	Attitude towards learning English	11, 12, 13, 15, 16, 17, 18, 50
F3	Interest in English Attitude towards English	9, 10, 14, 48, 49
F4	Computers for English recreation	31, 32
F5	Computer benefits	21, 22
F6	Face-to-face class time	19, 20

There were a total of 31 survey items analysed which were categorized into 6 correlational factors. The labels for these factors can be seen in table 20. Factor one comprised of 11 survey items that was collectively termed “Computers and Technology” all of which referred to similar factors involving student opinion on learning with computers and technology. This factor was by far the most significant of this data set and explained 30.7% of the variance of this data set. Factor 2 was labelled “Attitude towards learning English” and comprised of 8 items explaining a 9.2% variance of the data. Factor 3 was given the title “Interest in English” and related to overall student interest in learning English. This factor accounted for 3.3% of the total variance. The final three factors F4, F5 and F6 all composed of two items each labelled “Computers for English Recreation”, “Computer Benefits” and “Face-to-Face Class Time”. The total variance of these factors was much lower at 3.2%, 2.2% and 1.9% respectively.

The complete accumulative variance of these six factors explained 50.7% of the total data set. This reveals a 51% contribution rate for this set of results and illustrates that 49.3% of the remainder of these results were too insignificant and therefore were not further analysed. According to the statistical analysis rule of Kaiser’s criterion, only factors with an eigenvalue of 1.0 or more are retained for further investigation (Pallant, 2010). This can explain the reason the remainder of factors from 7-31 were excluded from this dataset and not deemed significant enough to be categorized into any group. Table 18 below describes the eigenvalue scores for all items analysed from this dataset.

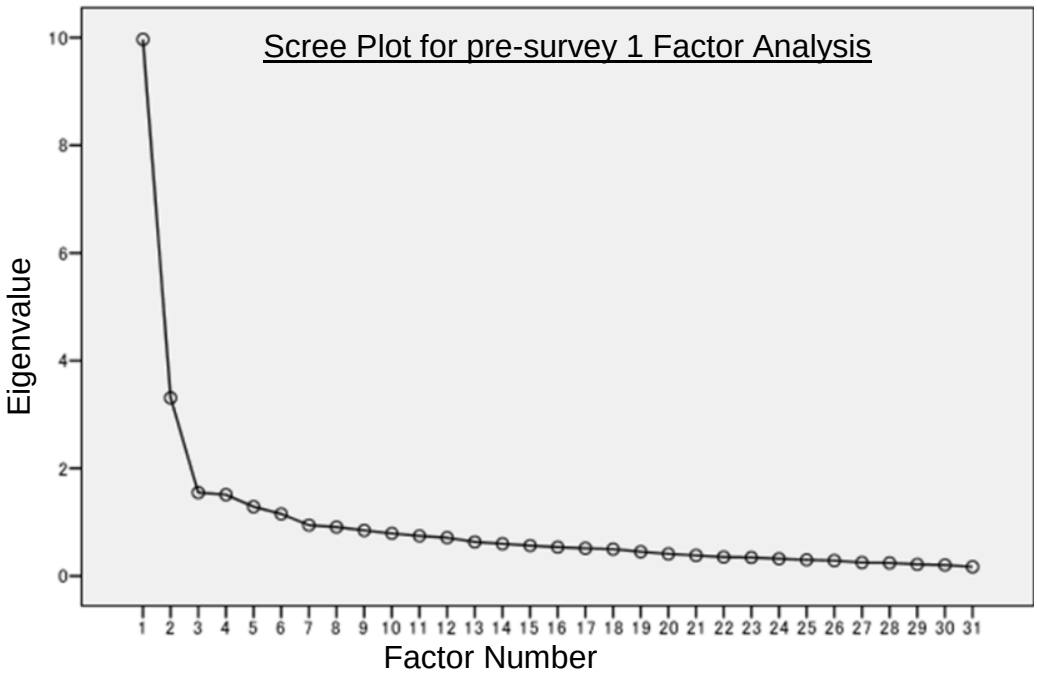
Table 22. Factor Analysis Total Variance Figures for Survey 1 – Before (Pre-Survey)

Total Variance Explained for Survey 1 Before combined

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Total
1.	9.968	32.154	32.154	9.538	30.769	30.769	6.543	21.106	21.106
2.	3.308	10.669	42.824	2.867	9.249	40.018	3.628	11.702	32.809
3.	1.549	4.998	47.821	1.026	3.311	43.329	2.094	6.755	39.563
4.	1.511	4.876	52.695	1.010	3.257	46.586	1.405	4.532	44.096
5.	1.287	4.152	56.847	.696	2.244	48.830	1.300	4.193	48.289
6.	1.153	3.719	60.566	.583	1.882	50.712	.751	2.423	50.712
7.	.945	3.048	63.613						
8.	.909	2.932	66.545						
9.	.846	2.730	69.275						
10.	.491	2.553	71.828						
11.	.745	2.402	74.230						
12.	.711	2.295	46.525						
13.	.633	2.041	78.566						
14.	.599	1.931	80.497						
15.	.566	1.825	82.322						
16.	.536	1.730	84.051						
17.	.515	1.661	85.712						
18.	.498	1.607	87.319						
19.	.451	1.454	88.774						
20.	.410	1.324	90.098						
21.	.383	1.235	91.333						
22.	.353	1.139	92.472						
23.	.344	1.109	93.581						
24.	.321	1.037	94.618						
25.	.300	.967	95.585						
26.	.286	923	96.508						
27.	.250	.809	97.313						
28.	.242	.782	98.096						
29.	.217	.698	98.794						
30.	.204	.657	99.451						
31.	.170	.549	100.000						

This is further illustrated in the “Scree Plot” graph below (figure 9). The scree plot describes the eigenvalues of each factor indicating at which point the shape of the curve changes direction and becomes horizontal. It was determined that this point occurred at factor 6 although there was very little variation in eigenvalue between Factors 4, 5 and 6.

Figure 9. Scree Plot for Factor Analysis Survey 1 – Before



What the results at this stage indicate is that there was a strong correlation between the 11 variables that made up factor 1 titled “Computers and Technology in English learning”. This can also be interpreted by assuming that the majority of students chose similar answers to all these survey items. Similarly student survey results for the variables in factors 2-6 showed a strong correlation.

4.3.2 Correlation Coefficient results for Survey 1

In relation to the correlation between individual constructs within survey 1 this data was further analysed using a “Correlation Efficient” tool. The most appropriate survey item was identified and correlated against several other individual items. Item number 42 was chosen for this purpose as this item asked for the most general opinion on the use of computers and their effectiveness in learning.

Item 42. コンピュータやインターネットの使用は、英語のリスニング力を向上させると思います。

I think using the Internet and computers helps to improve listening skills in English.

This item was correlated against its proceeding items 43-50. The results for this analysis are viewable in Table 22 below.

Table 23. Correlation Coefficient Figures for Survey 1

Correlation Coefficient figures

		Q 49	Q 48	Q 47	Q 46	Q 45	Q 44	Q 43	**Q 42**
Q49	Pearson Correlation Sig. (2-tailed) N	1 408	.660** .000 408	.319** .000 408	.239** .000 408	.352** .000 408	.327** .000 408	.337** .000 408	.394** .000 408
Q48	Pearson Correlation Sig. (2-tailed) N		1 408	.318** .000 408	.229** .000 408	.323** .000 408	.311** .000 408	.290** .000 408	.400** .000 408
Q47	Pearson Correlation Sig. (2-tailed) N			1 408	.715** .000 408	.768** .000 408	.684** .000 408	.553** .000 408	.714** .000 408
Q46	Pearson Correlation Sig. (2-tailed) N				1 408	.667** .000 408	.684** .000 408	.509** .000 408	.563 .000 408
Q45	Pearson Correlation Sig. (2-tailed) N					1 408	.706** .000 408	.621** .000 408	.736** .000 408
Q44	Pearson Correlation Sig. (2-tailed) N						1 408	.560** .000 408	.652** .000 408
Q43	Pearson Correlation Sig. (2-tailed) N							1 408	.623** .000 408
Q42	Pearson Correlation Sig. (2-tailed) N								1 408

Note: **p<0.1

The most positive results from this table were observed in items 44, 45 47. To emphasize these positive results they were highlighted. These three items are listed below.

Item 44. I think using computers in a TOEIC class is beneficial.

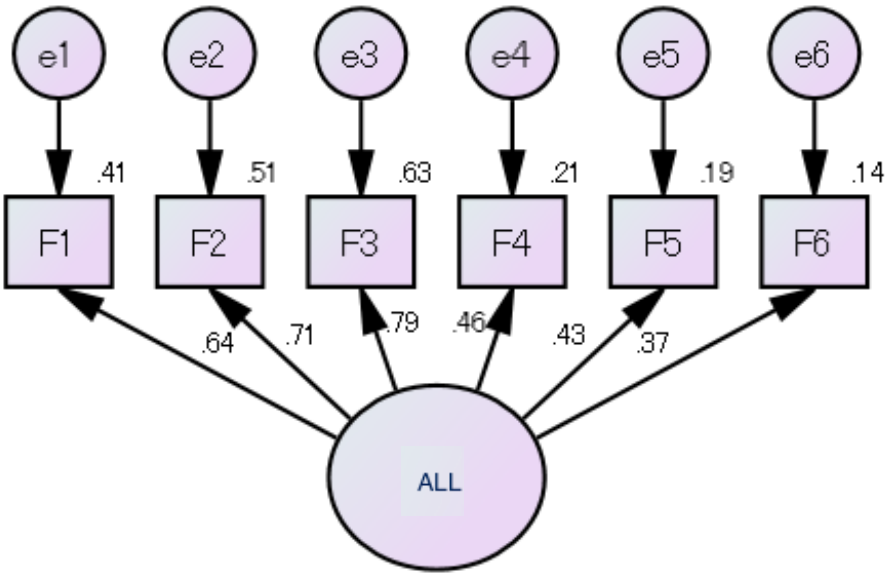
Item 45. I think learning with technology can be effective for all levels of English learners

Item 47. I think learning with computers and technology can be effective in learning a foreign language

Item 44 refers to the use of computers and technology in a TOEIC class and shows a 65% correlation to responses to item 42. This means that a large proportion of students (65%) have similar opinions on the use of technology while taking a TOEIC based class. The most positive of results produced at this stage was the correlation between item 42 and 45 at .736. These two items closely resembled each other with one asking for opinion on the use of computers and technology to improve English listening skills while the other asked about the effectiveness in learning English in all levels of learners. This figure states that there is a 74% chance that results for these two items are correlated. Essentially, 74% of the collective opinion on the use of computers and technology to improve English skills in all levels of learners is related. Likewise the correlation between items 42 and 47 is also very strong at 71%.

4.3.3 Path Analysis Results for Survey 1

Figure 10. Path Analysis Results for Survey 1 – Before



Now that the contributing factors have been identified their correlation to each other and regression rates can be statistically defined. These results show the correlation between each factor as opposed to each individual item as in the previous table (19). Using the AMOS (Analysis of Moment Structures) tool in SPSS, the regression path analysis covariance results were calculated. The bottom figure shows the regression rate as a percentage, while the top numbers show the contribution rate to the data as a whole (F7). The most significant results at this stage are for F1, F2 and F3 accordingly.

Table 24. Factor Labels for Survey 1 (Before)

	LABEL/NAME
F1	Computers and technology in English learning
F2	Attitude Towards Learning English
F3	Interest in English
F4	Computers for English Recreation
F5	Computer benefits
F6	Face-to-Face class time

A high contribution rate would mean high significance and a high probability that results are correlated and can be trusted. A high regression rate would mean there is a high probability that the cause of F7 (all items) is the effect of the result at which the arrow points. The arrow indicates the direction in which this path flows, from cause to effect. Results for Factor 3 show a contribution rate of 63% which means that a large majority of results for this factor (Interest in English) are correlated, while almost half, 51% of results for Factor 2 (Attitude towards English) are correlated. As the size of Factor 1 (Computers and technology) contained relatively more items than alternative factors the contribution rate was somewhat lower at 41% of results.

4.3.3.1 Summary of Results for Survey 1 – Before

Results for survey 1 essentially only indicate student opinion before the commencement of this project and before any technology was introduced. The

comprehensive opinion here is arbitrary as only external influence can explain the overall opinion at this stage. The most important data phase was one year later when the above constructs will be measured again using identical survey items. Survey results for this comparative section will now be introduced and compared. Any change in opinion will be discussed and highlighted.

4.4 Survey 2 – After Results (post-survey)

The following dataset indicates factor analysis results for survey 1 (after) for the group as a whole after the completion of this project. These results should indicate a change in opinion according to several variables. The sample size at this stage was marginally smaller at n=333 as opposed to n=409 for data calculated for survey 1 (before). The first calculations produced the results shown in table 24 below. Only 3 factors were discovered, the first comprised of 20 items while the second factor had 7 and the third factor had 3 items. This provided a disproportionate scree plot with only 3 eigenvalues (graph 4) and an unequal percentage total variance of 58% of the total for F1 alone (table 25). The same value for Factor 2 and Factor 3 were 8% and 3% respectively. This indicates that the majority of items were collated with this tool into just one factor. Due to this imbalanced result all the items for F1 at this initial stage were closely inspected and analysed again.

Table 25. Factor Analysis for Survey 2

Structure Matrix

	Factor			
	1	2	3	4
Q45	.957	.603	.384	.293
Q42	.953	.556	.367	.268
Q44	.952	.610	.348	.292
Q43	.951	.592	.387	.239
Q40	.950	.576	.425	.222
Q41	.940	.579	.399	.227
Q32	.934	.599	.462	.160
Q31	.931	.561	.423	.187
Q47	.916	.662	.483	.160
Q34	.912	.611	.408	.208
Q48	.901	.736	.372	.216
Q46	.899	.732	.453	.091
Q33	.883	.682	.321	.074
Q21	.826	.449	.452	.198
Q30	.781	.716	.265	−.106
Q29	.740	.589	.273	−.098
Q20	.721	.327	.489	.406
Q22	.681	.514	.307	.074
Q18	.666	.411	.455	.069
Q19	.619	.328	.474	.517
Q16	.586	.872	.368	−.106
Q14	.553	.807	.433	.070
Q15	.618	.757	.530	.073
Q11	.486	.747	.568	.188
Q13	.586	.686	.657	−.017
Q10	.390	.663	.374	−.126
Q17	.435	.496	.174	.449
Q8	.311	.360	.807	.018
Q9	.368	.565	.769	−.203
Q12	.546	.584	.740	−.149
Q7	.066	−.121	−.164	.696

Figure 11. Scree Plot for Survey 2 – Factor Analysis

Scree Plot for Survey 2 Factor Analysis

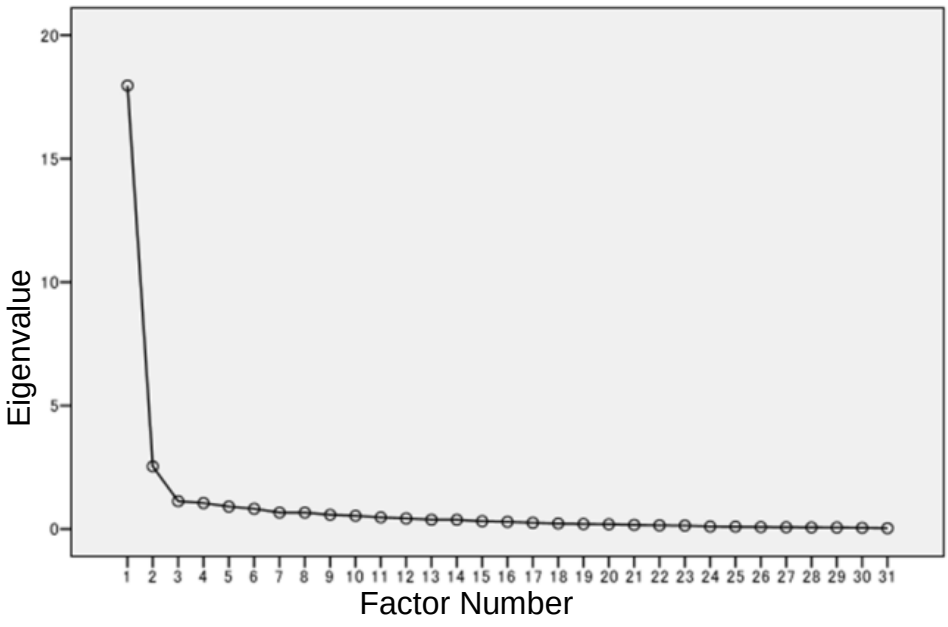


Table 26. Factor Analysis Figures for Survey 2

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation of Squared Loadings
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1.	17.963	57.945	57.945	17.963	57.945	57.945	17.367
2.	2.535	8.178	66.122	2.535	8.178	66.122	11.308
3.	1.127	3.635	69.757	1.127	3.635	69.757	6.592
4.	1.053	3.396	73.153	1.053	3.396	73.153	1.915
5.	.909	2.931	76.084				
6.	.821	2.349	78.733				
7.	.667	2.152	80.885				
8.	.332	2.145	83.030				
9.	.578	1.864	84.894				
10.	.536	1.730	86.624				
11.	.472	1.521	88.145				
12.	.428	1.380	89.526				
13.	.379	1.222	90.747				
14.	.376	1.212	91.959				
15.	.317	1.023	92.982				
16.	.291	.940	93.922				
17.	.253	.817	94.739				
18.	.225	.726	95.465				
19.	.205	.661	96.126				
20.	.192	.619	96.745				
21.	.168	.541	97.286				
22.	.148	.479	97.764				
23.	.141	.455	98.219				
24.	.101	.325	98.544				
25.	.096	.309	98.854				
26.	.080	.258	99.112				
27.	.070	.226	99.338				
28.	.065	.210	99.549				
29.	.059	.192	99.741				
30.	.047	.151	99.892				
31.	.034	.108	100.00				

This table shows the imbalanced factor analysis results as a total variance explained for survey 1 (After). Of the total 31 items that were analysed, results showed a disproportionate distribution as Factor 1 contained many more items than Factors 2, 3 and 4 combined. These factors resulted in a combined cumulative variance score of 73%. This can also be interpreted by concluding that 27% of the results did not contribute to a positive correlation. This number is much higher than

the 50% cumulative variance that resulted from the survey 1 results in table 18.

4.4.1 Correlation Coefficient Results After-Survey (phase 2)

In a similar procedure to the analysis of data for survey 1 in the pre-study, results at this stage were also analysed using the correlation coefficient tool in SPSS. All the same survey items were identical to each other in both the before and after surveys (Appendix 1.). The key survey item was survey item number 42.

Q42: I think computers and the Internet can help to improve my English skills.

The most significant results have been highlighted in yellow and are shown in table 26.

Table 27. Correlation Coefficient Figures for Survey 2 Combined Data

Correlation Coefficient figures

		Q49	Q48	Q47	Q46	Q45	Q44	Q43	Q42
Q49	Pearson Correlation Sig. (2-tailed) N	1 330	.657** .000 330	.398** .000 330	.303** .000 330	.337** .000 330	.344** .000 330	.334** .000 330	.415** .000 330
Q48	Pearson Correlation Sig. (2-tailed) N		1 330	.317** .000 330	.293** .000 330	.367** .000 330	.255** .000 330	.320** .000 330	.381** .000 330
Q47	Pearson Correlation Sig. (2-tailed) N			1 330	.782** .000 330	.701** .000 330	.648** .000 330	.583** .000 330	.602** .000 330
Q46	Pearson Correlation Sig. (2-tailed) N				1 330	.660** .000 330	.642** .000 330	.586** .000 330	.586** .000 330
Q45	Pearson Correlation Sig. (2-tailed) N					1 330	.684** .000 330	.700** .000 330	.636** .000 330
Q44	Pearson Correlation Sig. (2-tailed) N						1 330	.626** .000 330	.672** .000 330
Q43	Pearson Correlation Sig. (2-tailed) N							1 330	.684** .000 330
Q42	Pearson Correlation Sig. (2-tailed) N								1 330

Note: **p<0.1

There are several ways of interpreting these correlation scores. Cohen (1988, pp. 79-81) suggests that a correlation coefficient result shows little to no correlation with a score of 0.10 to 0.29, a medium correlation with scores of .30 to .49 and a large correlation with scores of .50 to 1.0. According to Cohen (1998) there was a large correlation between 16 of the 28 combinations available. This high number of significant correlations was equal to those of the before-survey results. When comparing these figures five significant changes were observed. Table 26 below, indicates the differences encountered. Table 28 shows the actual questions from the survey with key factors highlighted.

Table 28. Difference in Correlation Scores

Correlation	**Before**	**After**	Difference	Factor combinations
Q42-Q43	.623	.684	+.061	Computers and smartphone apps
Q43-Q45	.621	.700	+.079	Smartphone apps and teachers
Q46-Q47	.715	.782	+.067	Teachers and technology for learning
Q42-45	.736	.636	-.100	Computers and teachers
Q42-Q47	.714	.602	-.112	Computers and technology for learning

Table 29. Question Items Highlighted

Q	Factors
Q42	**Computers** are effective for learning **English listening skills**
Q43	**Smartphone** apps are effective for learning English
Q45	**Teachers** should use technology
Q46	**Teachers** should use **technology**
Q47	**Computers & Technology** are effective for learning EFL

The following changes were observed. A .061 or 6.1% increase in correlation score was observed for the relationship between questions 42 and 43. These constructs asked respondents to comment on how effective they thought computers were for improving their listening skills and the effectiveness of smartphone applications for English learning. What this could indicate is that over the course of this project students have shown a greater awareness of the benefits that smartphone technology can have on English learning, with a particular emphasis on listening skills.

This increase could be due to the blended learning experience and the influence that Quizlet may have had.

There was a similar increase in constructs 43 and 45 which asked students to comment on the use of smartphone apps in learning and the general use of technology in the classroom. There seems to be a strong correlation between these results which increased from .621 to .700 a difference of .079 (8%). The reasons for this disparity could again be the increased contact hours with technology that learners were allowed during the course of this project. An increase of eight percentage points is quite substantial. The highest result of all that was observed from the after survey results for the correlation between questions 46 and 47. These questions asked students to comment on whether they thought English should be taught in computer rooms and if computers and technology were effective with their learning. Results rose from .715 to .782 and increase of .067 or 7%. This indicates that before this project began students may have had an overall high regard for computers and technology, but a higher one after its completion. This course provided students with extensive opportunity to use technology for self-learning benefit in their own time. This freedom to use a combination of smartphone and online technologies in tandem with each other may have encouraged autonomous learning and raised the awareness of the benefits that technology can provide.

Questions 42 and 45 asked students to comment on very similar constructs, if they thought using computers were effective for learning English and if in fact teachers should use technology in the classroom to learn English with. The results for this correlation showed a decrease from .736 in the before survey to .636 in the after survey, a difference of -.100 or 10%. Although both results are in the 'large correlation' bracket according to Cohen (1988), the decrease could be due to a number of factors. These results merely indicate the relationship they have to each other and how similar they are as a pair. What this could mean is that students may have given higher

accumulative results when commenting on question 42, but slightly lower accumulative results for question 45. This imbalance may indicate that although the majority may be in favour of using computers and technology to learn with not all are comfortable with learning in this way. This same prediction can be made for the change in correlation results of questions 42 and 47 which also asked for comments on very similar topics. The difference for this section was -.112 (11%) changing from .714 to .602. Again, the reason for this change could be similar to the previously described change. Over the course of this project a small minority of the students in this course, perhaps the less motivated group may have become frustrated with the constant need to use technology to learn with. This could have involved confusion with login details or frustration with the volume of data to be comprehended. Put more simply, this minority group may have preferred to learn with paper-based lists as opposed to digital-lists.

4.4.2 Factor Analysis results for F1 of the After-Survey

The following results (tables 29-32) show the factor analysis results for phase 2 of the after-survey. These results consist of the Factor 1 items only from phase 1 of the after-survey factor analysis results displayed in tables 20 and 21. This instance of results provided four clear factors, table 29. Factor 1 comprised of 11 items all related to learning with computers and technology. Factor 1 at this stage was named "Technology and English Education". Factor 2 was titled "Motivation" while Factors 3 and 4 were titled "Computer Usage" and "Effort" respectively.

Table 30. Factor Labels for F1 After-Survey

Factor	**Name**	**Items**
1	Technology and English Education	21, 31, 32, 33, 34, 40, 41, 42, 43, 44, 45
2	Motivation	46, 47, 48
3	Computer Usage	22, 29, 30
4	Effort	18, 19, 20

Table 31. Factor Analysis for F1 of After-Survey (phase 2)

Structural Matrix

	Factor			
	1	2	3	4
Q42	.848	.326	.261	.289
Q45	.826	.409	.255	.328
Q32	.818	.453	.527	.272
Q43	.817	.432	.240	.271
Q44	.816	.333	.295	.238
Q31	.794	.362	.451	.274
Q40	.789	.449	.306	.429
Q41	.773	.393	.246	.323
Q21	.770	.338	.294	.266
Q34	.680	.485	.248	.290
Q33	.613	.416	.580	-.005
Q46	.385	.854	.432	.222
Q47	.441	.808	.311	.392
Q48	.363	.700	.257	-.034
Q29	.272	.284	.829	.164
Q30	.234	.398	.782	.055
Q22	.363	.170	.503	-.094
Q20	.329	.112	.188	.765
Q19	.241	.198	-.081	.710
Q18	.356	.398	.252	.480

Table 32. Factor Analysis

Structural Correlation Matrix

Factor	1	2	3	4
1	1.000	.483	.400	.332
2		1.000	.393	.258
3			1.000	.074
4				1.000

Rotation Method: Varimax with Kaiser Normalization

Pearson correlation coefficient results only showed minimal correlation between the individual factors. The most significant correlation was between factors 1 and 2.

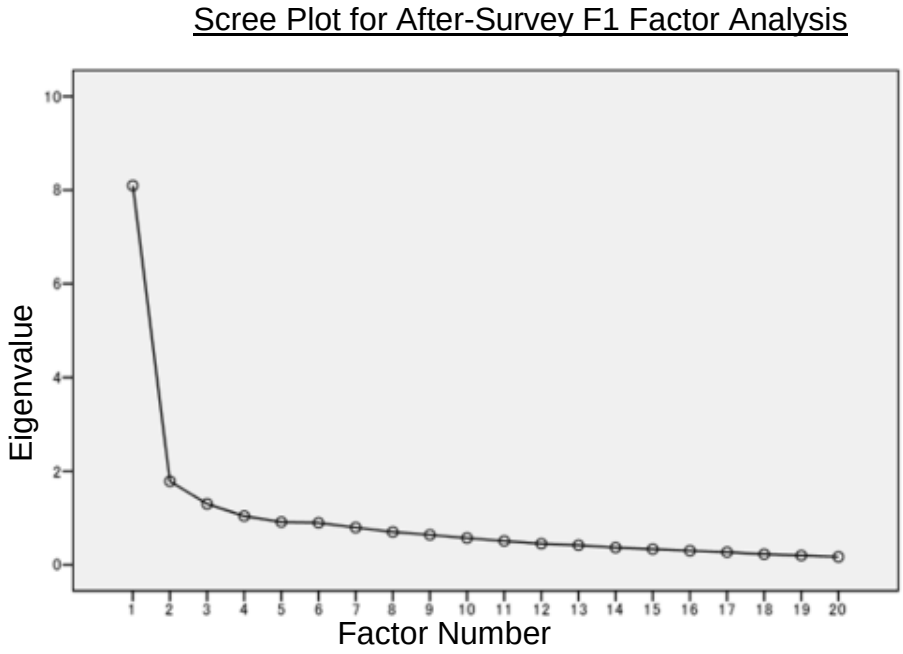
Table 33. Total Variance Explained for Factor 1 of Survey 1 After

Total Variance Explained

Component	Initial Eigenvalues			Extraction sums of Squared Loadings			Rotation of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.096	40.480	40.480	8.096	40.480	40.480	7.713
2	1.783	8.917	49.397	1.783	8.917	49.397	4.139
3	1.302	6.510	55.906	1.302	6.510	55.906	3.404
4	1.041	5.203	61.109	1.041	5.203	61.109	2.476
5	.913	4.566	65.675				
6	.897	4.483	70.159				
7	.796	3.978	74.136				
8	.702	3.511	77.647				
9	.641	3.203	80.850				
10	.572	2.861	83.711				
11	.510	2.549	86.260				
12	.452	2.262	88.522				
13	.420	2.100	90.622				
14	.368	1.842	92.465				
15	.336	1.681	94.145				
16	.302	1.512	95.657				
17	.271	1.354	97.011				
18	.227	1.137	98.148				
19	.200	.998	99.146				
20	.171	.854	1 00.000				

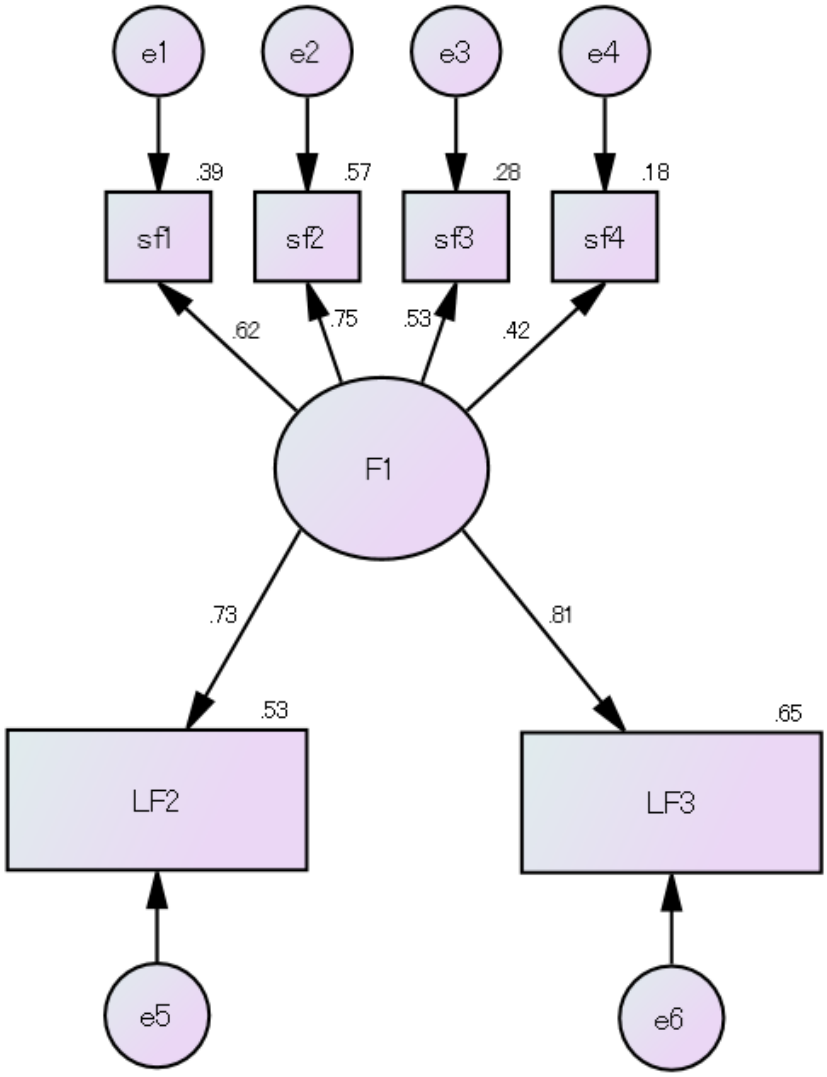
These results show the total variance scores and indicate that the combined total variance of all factors was 61% of the total. Of this percentage 40.5% were from F1 (Technology and English Education) while F2 showed a 9% variance (Motivation), F3 (Computer Usage) 6.5% and F4 (Effort) displayed a 5% variance. This suggests that almost 39% of this dataset were not correlated and students' responses displayed no correlation. However, 61% of this dataset contributed a significant distribution. The scree plot for this data in figure 12 below clearly shows the eigenvalues of 4 factors before the shape of the curve becomes horizontal at factor 5.

Figure 12. Scree Plot for Factor Analysis for F1 of Survey 2 Combined Data



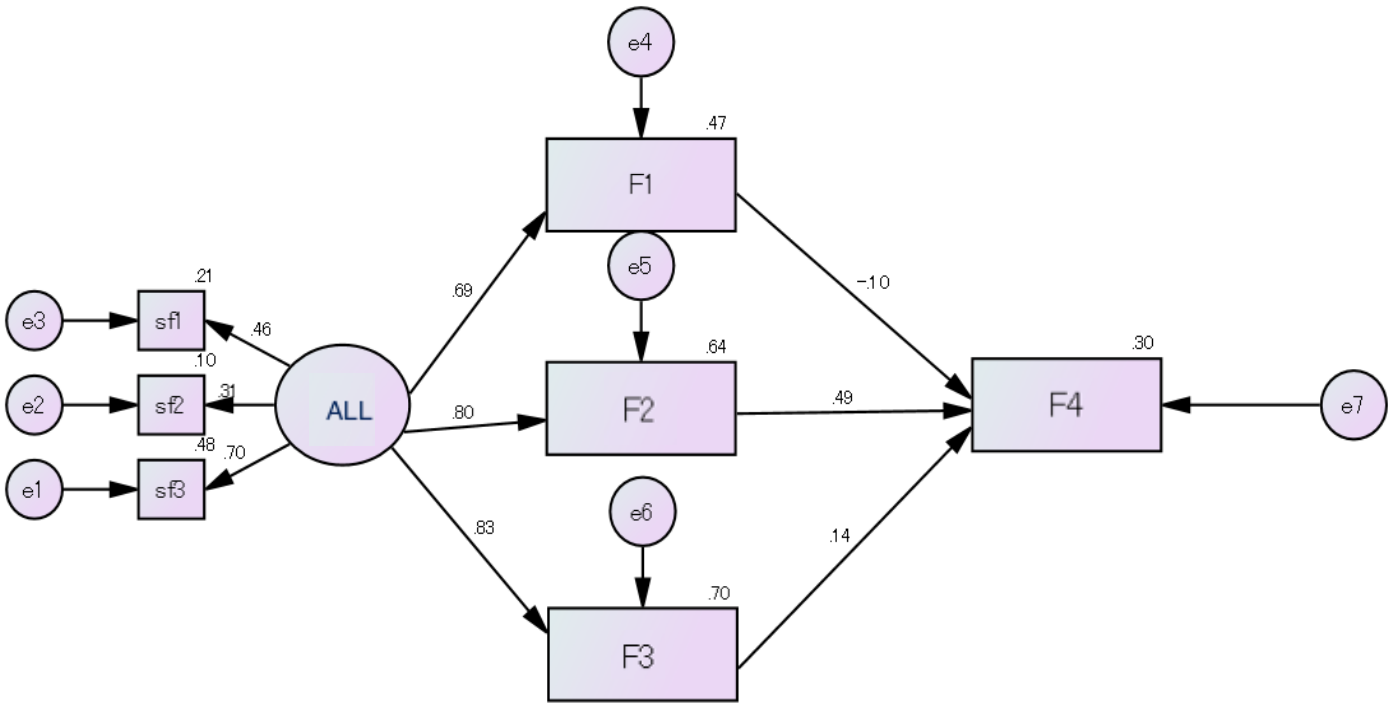
4.4.3 Path Analysis Results for Factors in After-Survey

Figure 13. Path Analysis for Factors in Survey 1 After



To demonstrate the link between each individual factor this data was further analysed. Figure 13 shows the individual correlation between each factor, the contribution rate, regression rate and its contributing variables. The central variable refers to the original Factor 1 containing 20 items retrieved from phase 1 of the analysis. LF2 and LF3 correspondingly refer to Factor 2 and Factor 3 also in the initial data analysis results. However, sf1, sf2, sf3 and sf4 refer to the 'small factors' that derived from phase 2 of the data analysis shown in tables 23, 24 and 25. The most significant small factor was 'sf2' with a contribution rate of 57% and a regression rate of 75%. This signifies that the link between the original F1 is strong and there is statistically a high probability that the result of F1 (computers and learning in general) is 'sf2' (motivation), whereas the link between F1 and 'sf4' is week and insignificant.

Figure 14. Path Analysis for F1 Data from Phase 2



NFI = 0.800 (Normed Fit Index)

CFI = 0.806 (Comparative Fit Index)

This path analysis diagram describes the quantitative data set from the after-survey data for survey 1. This data encompasses the data for Factor 1 results of the previous results shown in table 29 above. As previously described, four factors were realised from this result. The above diagram indicates the possible cause and effect by illustrating the direction in which each path flows. The sphere to the left represents the link between all the results and each individual factor, whereas the rectangles to the right represent each specific factor. The most obvious path is between “All”, “F2” (motivation) and “F4” (effort). The regression rate of .80 indicated between “ALL” and “F2” shows that there is a very high probability that the connection between all constructs is the cause of F2 (motivation). In the second stage of this diagram the highest contribution rate is shown by F3 (computer usage) however, the regression link thereafter is not high at only .14. The link between F1 (technology and English education) and F4 (effort) is also week with a regression rate of only -0.10. The strongest link in this section is the link between “ALL” factors, F2 (motivation) and F4 (effort). To summarize this can be interpreted by stating that technology has helped to motivate a significant number of students which in turn has helped students achieve their learning goals.

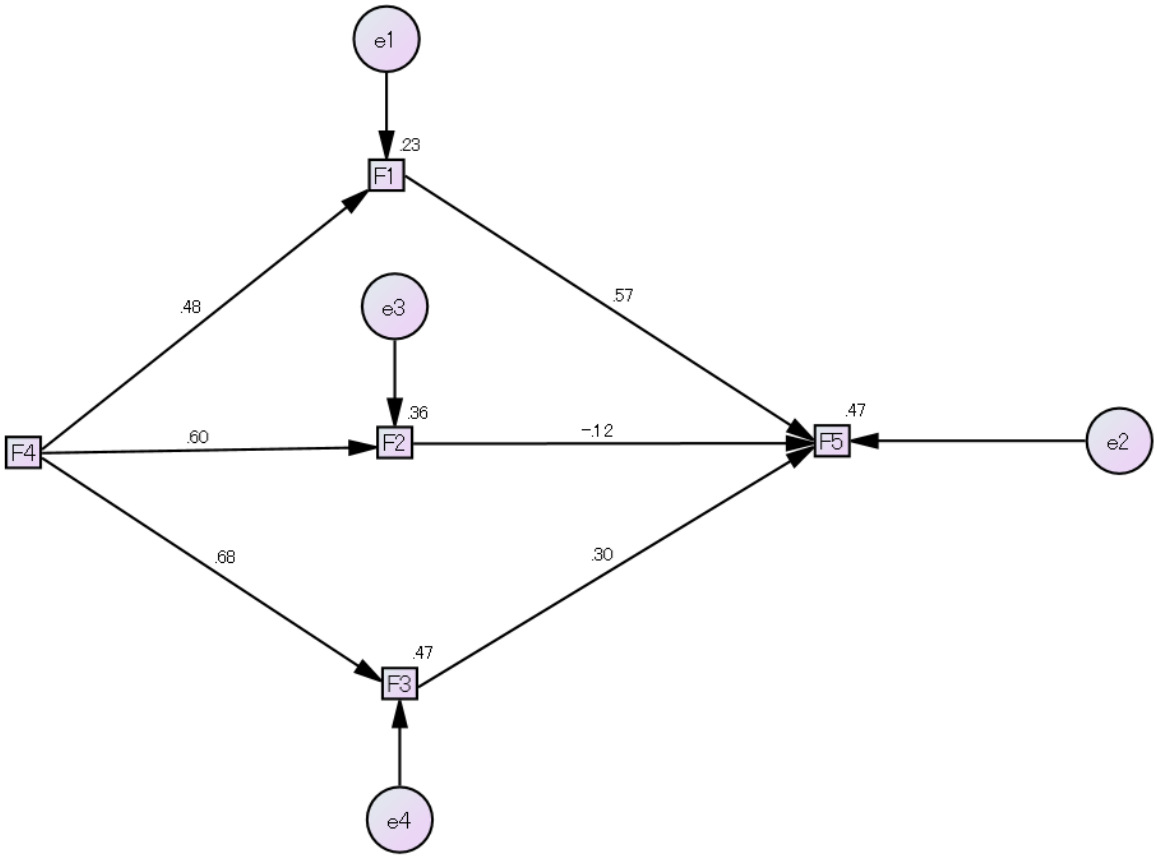
4.4.5 Post-survey Phase 3 Results (Year 2)

There was one final set of quantitative results retrieved from this study, referred to as phase 3. These results were obtained one year after completion of the pre-study in January 2015. There were several unique variables distinctive to this phase. The subjects were different to those in phase 1 and 2, however the course contents and objectives were all the same. Another major difference that must be noted was the learning medium. All students in this phase were instructed in computer classrooms with upgraded computers to those students of phase 1 and phase 2. This group was slightly smaller, and comprised of 381 students. The exact same survey items were used to measure the same variables as in survey 1 and survey 2. However, only path analysis

data results will be investigated for this dataset. The decision was made to obtain this data as a comparative measure to confirm changes between qualitative results from phase 2.

For the final set of quantitative data the self-created subjective factors were used in place of SPSS calculations. There were 5 factors in this section, the same as in table 12.

Figure 15. Path Analysis for Survey 3, Year 2



This path analysis diagram shows the link between the five factors shown in table 14. The obvious link here is from F4 (technology & learning), to F1 (attitude, interest and motivation towards English) then to F5 (lifelong learning). What this path indicates is that the cumulative student opinion on technology and learning (F4) is closely related to the collective opinion on 'attitude, interest and motivation towards learning English (F1) which in turn is partially related to aggregate student opinion on English and lifelong learning.

What is quite different here is that F4 (technology and learning) the major factor in this entire project, is the cause and starting point in which the path flows in both directions. All previous path analysis results did not have F4 or technology and learning at such an early stage in the diagram. There is also a relatively strong connection in the path between F4, F3 (computers and learning) and F5 (English and lifelong learning). Qualitative results obtained from the final question in the after-survey for phase 3 will now be discussed.

4.5 Qualitative results

This section aims to answer the second research question involving any changes in student attitude towards learning with technology in the foreign language classroom. The following open-ended question was added to the post-survey, conducted in week 30 after completion of the course. In order to obtain an extensive response, the question was written in both Japanese and English and kept as simple as possible.

Q.51: Quizlet は、役に立つ学習教材だと思いますか？ それはなぜですか。

Do you think Quizlet is a useful learning tool? If so, why?

This simple question provided a large volume of qualitative data. Every respondent who gave their consent to taking the survey provided a response. There were 328 student responses overall, 186 male, and 142 female students. From the 328 responses obtained, 5 responded in English and 323 in Japanese. All responses received in English were translated into Japanese and then analysed with a text data-mining tool called *Wordminer*. *Wordminer*, version 1.0 (2008) created by Fujitsu was used for this task. This text-mining tool was initially created for use in Japan and is currently only available in Japanese. All collated data received on output was subsequently translated back into English for the benefit of readers of this paper.

Wordminer (Version 1.0, 2008) is a statistics tool that specifically analyses Japanese discourse within a qualitative dataset. *Wordminer* omits any irrelevant words or characters which may come in the form of simple prepositions in Japanese like に(ni)、から(kara), で(de) that bare little to no significance on the meaning of the discourse. This text analysis tool also omits repetitive pronouns or verb forms that may have no effect or significance to the meaning intended. Once *Wordminer* has sufficiently carried out these tasks and omitted repetitive discourse a much smaller dataset will remain. Of this smaller dataset wordminer uses a complex of calculations to categorize data into correlative groups called clusters. Each cluster will then have a correlation to each corresponding choice from the 1-6 Likert scale (table 3) made by the respondent.

Of all the 328 responses a total of 8,990 Japanese characters were obtained. Of these, *Wordminer* selected 676 text items, which were deemed suitable for text mining. From that 676 dataset, 50 words were repeated 5 times or more and grouped into 7 clusters. The distribution of each cluster was graphed with their correlation to each corresponding student choice to the construct (47) below:

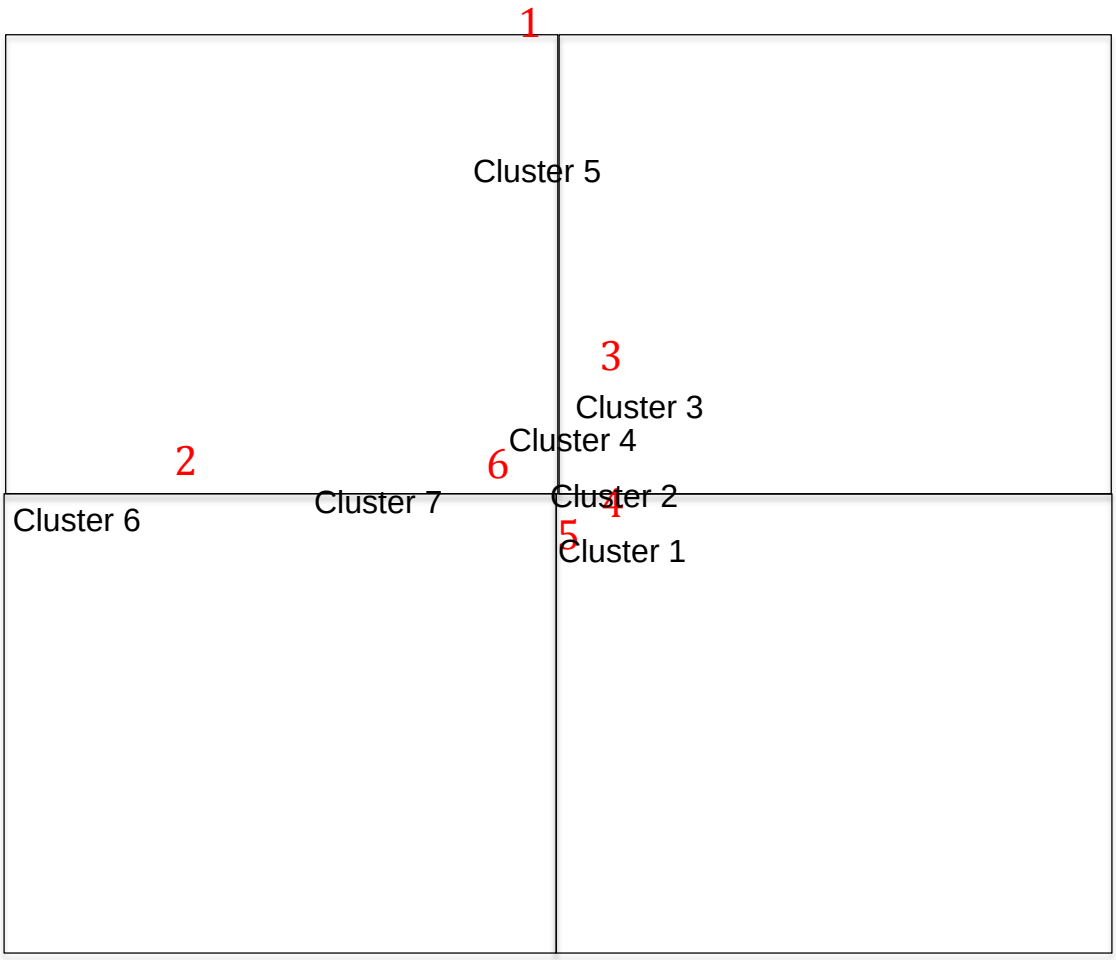
Construct 47: コンピュータや他のテクノロジーは、様々な学習の効果を促進すると思う。

I think learning with computers and technology can be effective in learning a foreign language

Respondents were firstly asked to respond to this construct (see Appendix 1.). In relation to this construct, respondents were also further asked to answer the open-ended question Q.51, regarding feedback on the primary blended learning tool that was introduced.

The distribution graph below (figure 16) shows the cluster formation with repetitive keywords highlighted.

Figure 16. Text Mining Cluster Graph



The single digits here refer to the Likert scale choice students chose for construct 47 of the survey. Their distribution on this cluster graph relates to the cluster of words students chose to answer question 51. See table 33 below for cluster word groups.

Table 34. Cluster Word Groups from Text-miner Analysis Survey 1 (phase 1)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
1.	Quizlet	スマートホン smartphone	たくさん many kinds of	役に立つ useful	あまり not really	パソコン computer	思う I agree
2.	yes	教材 learning tool	アプリ smartphone application	ゲーム games	方がいい bothersome	以外 except for	ゲーム感覚 like a computer game
3.	なぜなら due to the fact	繰り返し repetition	テスト形式 test tool	単語 words			スペル correct spelling
4.	スマホ smartphone	共有 collaboration	英単語 English vocabulary	単語帳 word list			テスト test function
5.	意味 meaningful	練習 practice	画像 visual aid	登録 sign up			英語力 English level
6.	何度 repetition		簡単 easy to use	勉強 study			何回 countless times
7.	学習 study tool		電車 on the train				手軽 simple and convenient
8.	学習教材 learning materials		入力 fill in				頭 easy to remember
9.	気軽 with ease						発音 pronunciation
10.	時間 any time						様々 various ways of
11.	自分 self						理由 many reasons for
12.	大変 very easy to use						
13.	良いところ good point						
14.	復習 review						
15.	便利 convenient						

Items in cluster 4 and cluster 7 were shown to have a high correlation between respondents who chose the most positive option on the Likert scale of 6 for construct number 47. Cluster 4 consists of the following items:

Japanese: 「たつ・ゲーム・単語帳・単語・登録・勉強・役」

English: (useful, games, word list, words, sign up, study)

Cluster 7 refers to the following keyword items:

Japanese: 「おもう・ゲーム感覚・スペル・テスト・英語・何回・手軽・頭・発音・様々・理由」

English: (I agree, like a computer game, correct spelling, test function, English level, countless times, simple and convenient, easy to remember, pronunciation, various ways of, many reasons for)

These results suggest the following interpretation from a collective students' perspective. All keywords have been underlined for simple recognition.

> *"Through the use of the Quizlet smartphone app, we can learn new words at our own pace wherever we want. Quizlet helps us with the correct spelling and pronunciation of new words and repeats difficult vocabulary items countless times until understood. It is a simple and easy to use learning tool that provides various ways of learning new words making learning more enjoyable and giving it the sensation of playing a computer game in English class. With the inbuilt test function, it is now much easier to check our own English level, the perfect tool for a test-based class."*

In reference to this, two students who gave positive feedback and chose number 6 on the Likert scale gave the following comments. Their original comments were translated into English.

S1: Through the process of using Quizlet for one year I have learnt various new ways of learning new words and creating my own word list. I think it is a very useful learning tool.

S2: With Quizlet you can review words and their meanings as many times as you like. With the smartphone app you can review them on the go, wherever you are. I think it is a very useful tool.

As stated above, on the whole these results are experimental proof that through the use of a smartphone-learning tool such as Quizlet , student attitudes towards technology can be approved in a positive manner.

Conversely, the distribution of respondents who provided critical feedback by choosing 1- strongly disagree, typically chose words from cluster 5 (not really, bothersome). Very few words were included in this cluster as very few students chose number 1 for construct question 47. There were 7 students from a total of 328 who selected number 1 – strongly disagree for construct 47, from this dataset. Two respondents, who constitute this dataset, gave the following comments.

S3: I think it is easier to remember words by writing them down on a piece of paper.
S4: I have no use for this tool in my daily study routine. I like the way I learn.

A large proportion of the respondents in this lesson study were owners of smartphones through which they accessed Quizlet and other learning tools. Although all learners in this study can be termed “Digital Natives”, (Prensky, 2001) who were born in the ‘digital age’ and may have been influenced by digital technologies from a young age, many may still prefer to acquire their knowledge through analogue forms. Student 3 above can support this notion by declaring that writing words on paper may be a more efficient way of increasing vocabulary than learning them digitally. This mind-set may have been influenced by the average high school education in Japan where lessons conducted in computer laboratories are very rare and smartphone usage at school is for the most part, prohibited. Through obtaining such qualitative data it can be concluded that careful consideration must be give to both types of learners in future research of this nature.

4.5.1 Survey 1 – Phase 2 (After Results)

There was a third phase of data collection for the pre-study. This third phase was one year subsequent to the completion of the post-survey and included several varying factors. Subjects were not the same, but the instructors were. This time the sample size was slightly smaller with a sample size of 381 students. The major difference though at this stage was that all of these students were taught in computer rooms for one academic year. Both hardware and software installed in these classrooms had recently been upgraded to Windows 8 which provided for a faster overall speed and more user-friendly interface. Instructors should have improved confidence levels in their instruction and use of Quizlet in the classroom after the initial transition phase of one year previous. The following set of results give further indication of how Quizlet and the digital learning experience was perceived by the student. To avoid complications only qualitative data will be observed and discussed here.

The same method of data analysis was used as with survey 2 in the pre-study. Wordminer was employed to analyse the qualitative data, this time from construct 40 and question 49.

Construct 40: スマートフォンのアプリは、英語学習に効果があると思います。

"I think smartphone apps can be effective for learning English."

Question 49: Do you think Quizlet is a useful learning tool? Why?

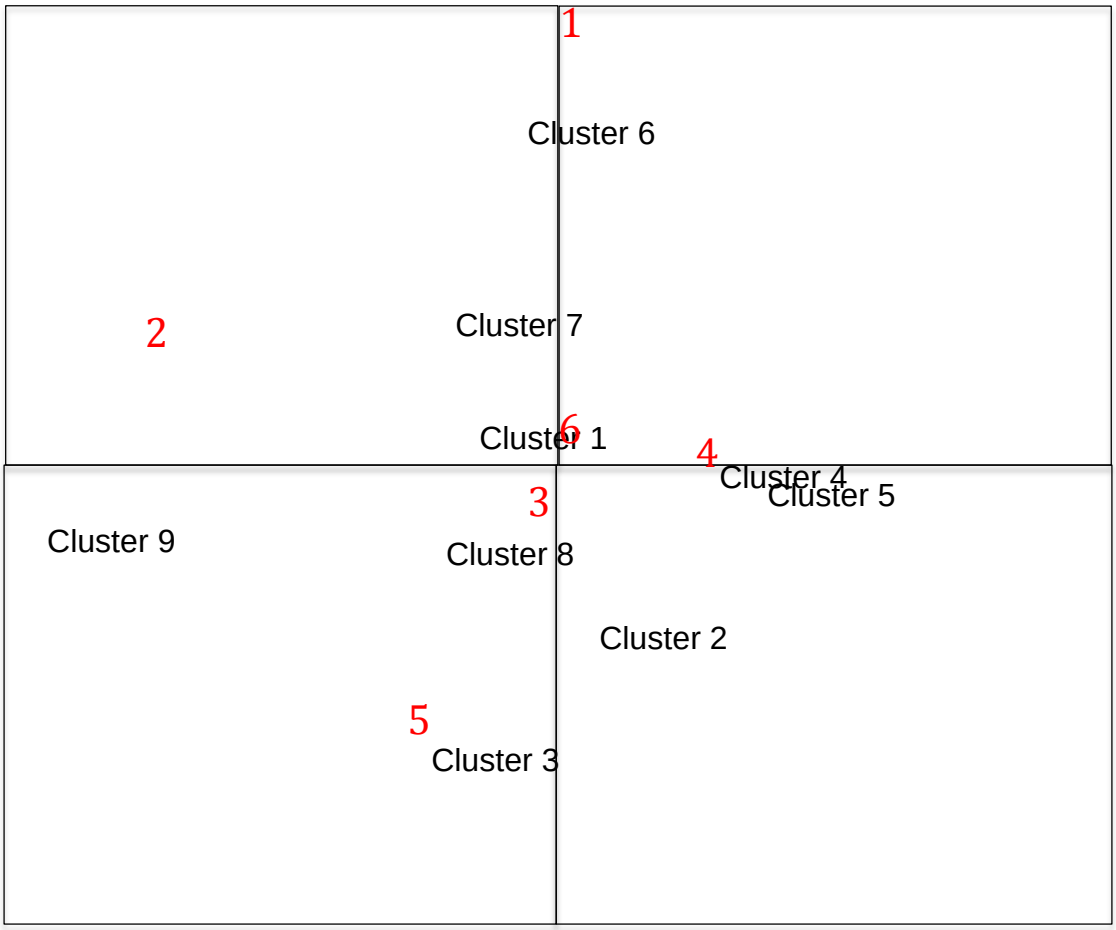
There was a total of 11325 Japanese characters received from this data collection. Wordminer selected 1029 text items which were deemed suitable for text mining. This number was substantially more than the 676 items that were detected at the same stage in the survey 2 dataset. From this number, 86 words were repeated 5 times or more and were grouped into 9 clusters. All 9 clusters with their original word items in Japanese and their English equivalent are shown below in table 35.

Table 35. Cluster Word Groups from Text-Miner Analysis Survey 1 (phase 2)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8	Cluster 9
1.	Quizlet	Quizlet	Is	色々な Various	Quizlet	Yes	方が Better than	ときに during	やりやすかった good interface
2.	時間 Time	インターネット Internet	たくさん Frequently	リスニング Listening	繰り返す repeat	あまり not really	パソコン computer	分かりやすい easy to understand	キーボード keyboard
3.	自分 Self	ゲーム A game experience	なぜなら Due to	ログイン Log in	検索 search function	きちんと accurate	確認 confirmation	スマホ smartphone	一緒 collective
4.	手軽 Simple and convenient	スマホ Smartphone	アプリ Smartphone app	何度 Whenever	単語帳 word list	意味 meanings	効果的 effective	英単語 English words	絵 visual
5.	単語 Words	テスト Test	ゲーム感覚 As though it were a game	活用 Practical	利用 user-friendly	何回 countless times	色々 many ways	画像 images	理由 reason
6.	発音 Pronunciation	英語 English	暗記 Memorize	共有 Collaborative	練習 Practice	携帯 cell phone			
7.	復習 Review of words	復習 Learning	音声 Sound	効率 Efficiency		向上 progress			
8.	役にたつ Useful	学習教材 English learning tool	簡単 Easy to use	使用 Usability		入力様々 varied			
9.		教材 learning tool	気軽 User-friendly	自然 Natural					
10.		効率的 Efficient	苦手 Not good at	人 Collective					
11.		辞書 Dictionary	時 During	大切 Important					
12.		手間 time and effort	写真 Pictures						
13.		点 Grades	身近 Accessible						
14.		頭 easy to remember	登録 Register						
15.			普段 Normally						
16.			勉強方法 Way to learn						

The distribution of each cluster was graphed with its respective correlation to each corresponding choice for the construct 40 and question 49 above. Figure 17 below shows the distribution data for all clusters in relation to the student choice for construct 40.

Figure 17. Text Mining Cluster Distribution Graph Phase 3, Year 2



The single digits refer to the Likert scale student choice for construct 40 of the post-survey (Appendix 1). The cluster locations refer to the correlation between word items in that cluster, which *wordminer* associated with the individual student choice for construct 40.

There are several similarities to this set of data and the previous batch from survey 2. There were very few subjects who chose the most negative choice to construct 40 hence the outlier location of number 1 in the top of the y-axis in both distribution graphs 4 and 5 The location of number 2 (disagree) is also quite similar which suggests that for both groups there were very few individuals who had negative feelings towards the use of technology in a learning experience of this nature. However, for this dataset above there seems to be a concentration of clusters towards the central region near options 3, 4 and 6 for construct number 40. Whereas, for survey 2 there seems to be a wider distribution of clusters and a greater variation of opinions, towards Quizlet as a useful learning tool.

This can be more clearly represented by viewing the total distribution graph of the after-survey 2 phase 1 and survey 2, phase 3 in figures 18 and 19 below.

Figure 18. Total Distribution Graph of After-Survey Phase 2

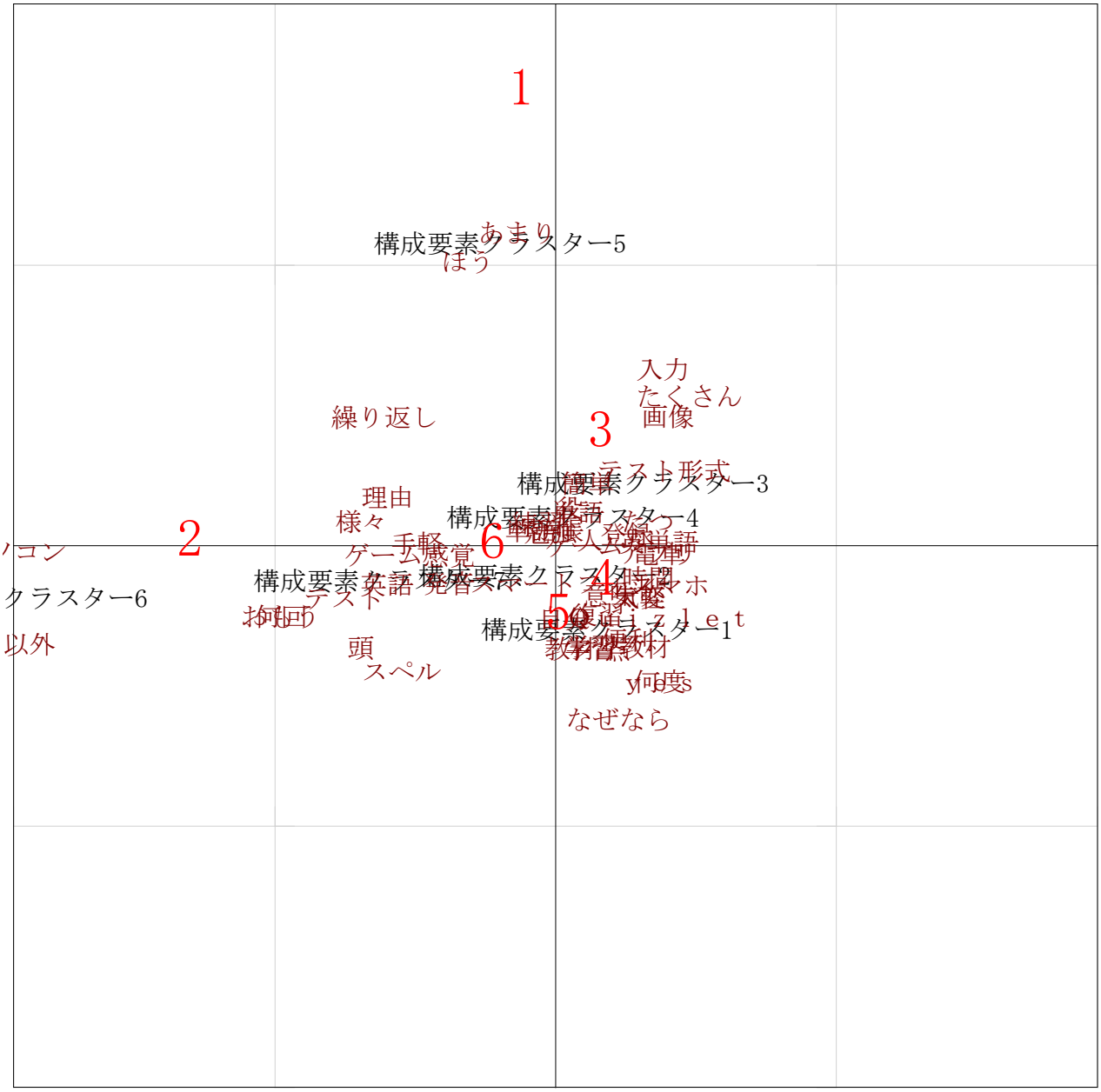
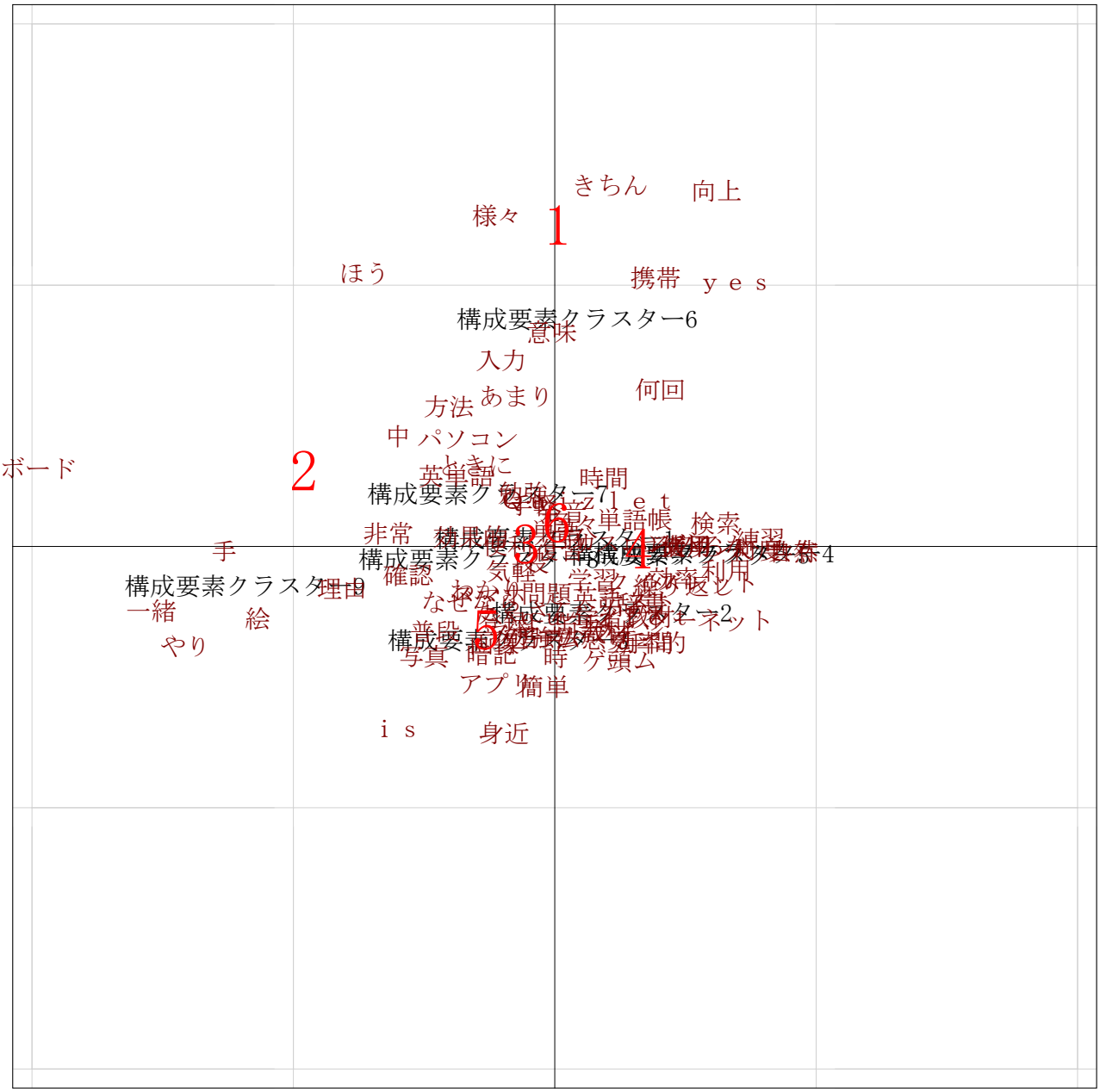


Figure 19. Total Distribution Graph of After-Survey, Phase 3



By comparing these qualitative results it can be concluded that the written discourse that subjects used in phase 3 was more positive than in phase 2. Perhaps more significant is the reduction of critical or negative comments for students who chose numbers 2 or 3. Coincidentally, many students who did choose these options for construct 40, chose to give a more conclusive remark on their perception of learning with Quizlet.

Three students were randomly selected who fit into this category. Their individual comments are as follows:

S1, who chose 2 for construct 40 wrote:

単語の勉強もできるしそれを反復で勉強できるからいいと思う。

I think Quizlet is good because we can learn new words and practice them as many times as we like with the smartphone app.

S2, who chose 3 for construct 40 wrote:

思う。 わからない単語を調べることができ辞書代わりにもなるし、ちょっとした単語テストもできるから。

Yes, I think Quizlet is a good learning tool. We can easily learn new vocabulary with it. We don't have to use a dictionary and we can test ourselves on our words any time with the test tool.

S3, who chose 3 for construct 40 wrote:

単語を勉強するには音声も聞けるしとっても役に立つと思います。

Quizlet allows us to learn new words by giving us the pronunciation of that word. This is very useful.

The items in cluster 1 and cluster 8 closely resemble students who chose either 3 (somewhat disagree) or 6 (strongly agree). There is a large fluctuation between these answer choices as one is remotely negative and the other is profoundly positive. What this suggests is that despite an overwhelmingly favourable opinion of Quizlet not all students may have been using other smartphone applications effectively to learn English. This construct does not specify Quizlet and refers only to smartphone applications in general, which could explain this conundrum.

There was a total of 14 students who answered number 6 to construct number 40. The following two comments were randomly chosen from this number.

S4: オンラインで勉強をするのはとてもやる気が出て飽きないので効果的だと思う。

I think online learning with technology is very motivational. I never get bored with this type of learning and believe it is a very effective way to learn.

S5: クイズレットはとても役に立つと思います。単語を登録して自分だけの単語帳が作れる上に、自分でテストを行って単語の習得度を確認できるので、覚えるまで学ぶことができると思います。発音も聞けるので、読めない単語を理解できるので非常に助かります。

Quizlet is a very useful tool. After making your own word lists you can test yourself as many times as you like on words you don't know. It's a great way to learn new words. Quizlet provides us with clear pronunciation, which is very helpful for words we can't read.

Conversely, there were a total of 20 students from the total of 381 who chose the most negative option of number 1, for construct 40. It could be predicted that subjects who chose the most negative option to construct 40 would also give pessimistic comments about Quizlet. This was not the case and several students gave decisive comments. Three students from this number gave the following comments:

S6: わからなかった単語をパソコンだけではなく。携帯でも見直せるところとわからなければすぐ入力することができるとこがいいと思った。

I thought that it was really useful to be able to see any new words inputted into our computer site on our phones. This was a really good function of Quizlet that allows our devised to be synced

S7: Quizlet は役に立つと思う。単語を打ち込み、意味を打ち込み、それらを繰り返して勉強できるし、間違えたものから優先的に復習できるのはとても良いことだと思うから。

I thought Quizlet was a very useful learning tool. Adding words, checking meanings, adding pictures is a good process to learn. I also liked that Quizlet highlights the words we don't know and reviews us more on them.

S8: いいえ。普通の英和辞書と同じだと思って使っていたから。

No, I didn't think Quizlet was useful. I think it is better just to use a dictionary.

Despite students giving a negative response to the multiple choice question, on further inspection it was found that in fact those students collectively gave mutual positive feedback about Quizlet. There were very few cases where comments were outright unfavourable.

Likewise students who chose answer 4 (somewhat agree) typically described Quizlet with items from clusters 4 and 5 in (table 35). Students who chose number 5 commonly chose word items from cluster 3 (figure 17), the largest group of clusters while students who chose number 6 consistently described Quizlet with words from cluster 1.

It appears that the overall perception of Quizlet in phase 3 of the data collection is slightly more positive with an emphasis on favourable comments. Many of the written discourse and expressions used were very similar to the collective impression by the first group. The overall concerted opinion of the group could be summed up as follows:

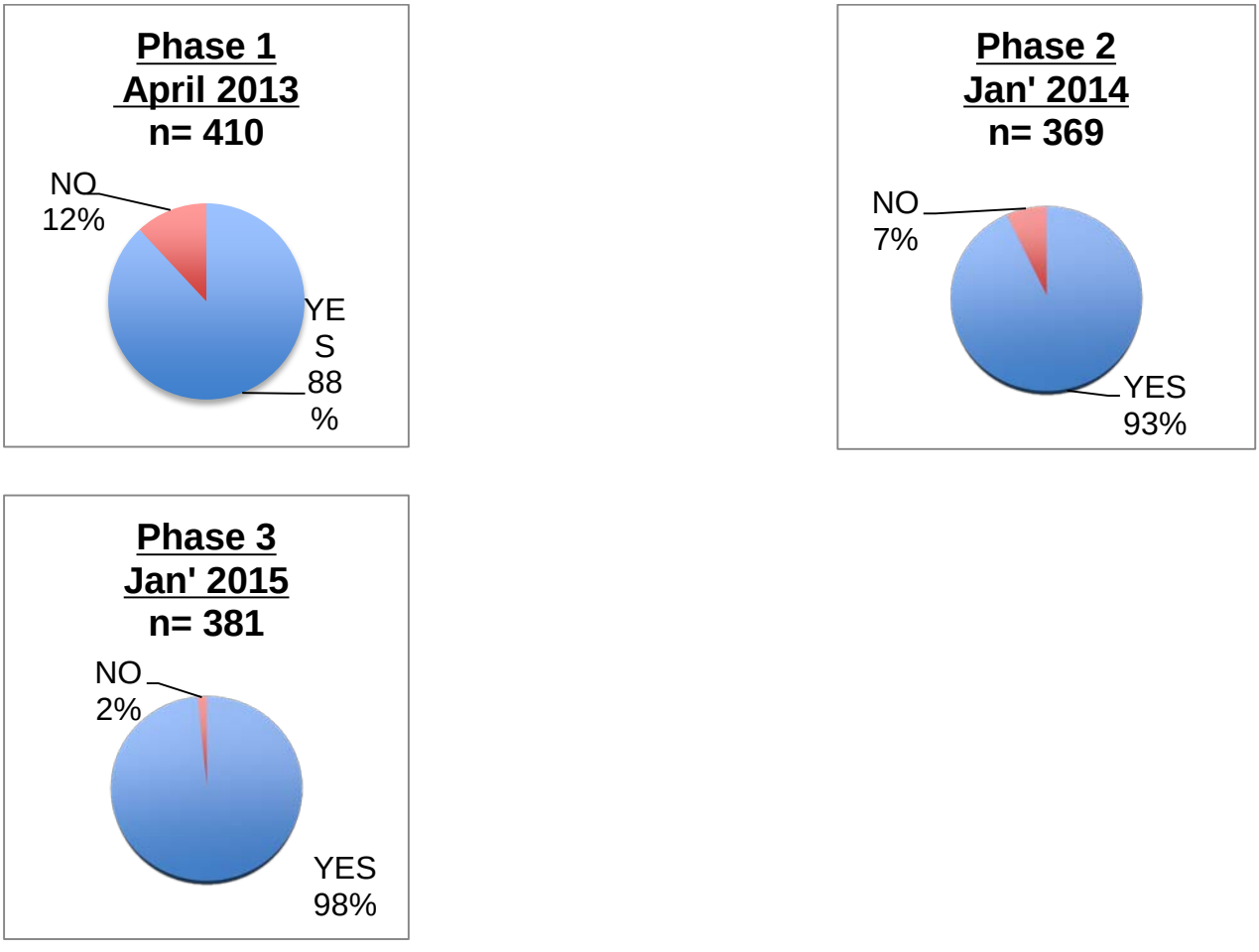
"*Quizlet is a very useful tool for learning English. Quizlet provides us with an audio tool that gives us clear pronunciation of every word we look up. It also provides us with a picture and visual aid, which makes the memory of words very efficient. The in-built dictionary is also easy to use and provides a simple and convenient tool that makes searching and adding new words very simple. Quizlet also allows us to learn collaboratively by giving us access to classmates' word lists. Through Quizlet we can also confirm our comprehension of new words and use the inbuilt tools to review our words with each other. This makes learning fun as though it were a game. With the smartphone application we can review and practice our words as many times and wherever we want. The learning interface for the most part is easy to*

use and most of us think that this tool is a very suitable one for learning English."

4.5.2 Smartphone Ownership

As was previously stated a large proportion of the students in this study were owners of smartphones. One of the questions in the pre-survey asked if subjects owned a smartphone. This same question was asked again in the post-survey and then again in phase 3 one year later. These are the results of smartphone ownership over this two-year period.

Figure 20. Smartphone Ownership



Over time smartphone ownership has clearly risen substantially. Although this increase was indisputable it cannot be confirmed what factors caused this change. Students in the A group without smartphones may have been subconsciously influenced

by those with them or it could have been an external factor not connected to this study in any way that caused this change. Although it is difficult to pinpoint the exact reason for this change, it comes as encouraging news for future research in mobile language learning. In the near future, ownership will eventually reach the 100% benchmark which would bring further opportunity for mobile language research like this.

4.5.3 Test Results

The second source of data for the pre-study involved test results taken on the day of commencement of the course in week 1 and then again in the final week of term, week 30.

Results were divided into their respective A groups and B groups and further subdivided into three pairs. Pair 1 in table 35 below, shows mean scores of the listening portion of the test, pair 2 refers to the reading portion of the test, while pair 3 indicates the total means. The test used in this case was the TOEIC Bridge test comprising of a maximum grade of 100, with 50 for the listening portion and 50 for the reading portion.

4.5.3.1 Group B test scores

Table 36. Group B Test Mean Scores

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BLB	27.8274	150	5.50506	.44949
	BLA	29.9249	150	6.02022	.49155
Pair 2	BRB	26.8865	150	5.58586	.45608
	BRA	27.0400	150	6.24756	.51011
Pair 3	BTB	54.5128	150	9.70415	.79234
	BTA	56.9649	150	10.71939	.87523

Students in the B group showed an overall mean average increase of 1.4% and a fairly large distribution with standard deviation score of 10.7.

Table 37. Paired Sample t-test and p-test Scores for Group B

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	BLB - BLA	-2.097	8.62014	.70383	-3.48831	-.70675	-2.980	149	.003
Pair 2	BRB - BRA	-.153	8.74680	.71417	-1.56475	1.25768	-.215	149	.830
Pair 3	BTB - BTA	-2.452	15.22568	1.24317	-4.90866	.00439	-1.972	149	.050

The t-test results shown in table 37, state that there was a significant difference between the group B results in the listening portion of the post-test, but very little difference between the reading pre-test and post-test results for this group. What this indirectly demonstrates is that blended learning, or the lack thereof as this group had less exposure, showed to have a far greater effect on listening scores, than reading scores. Coupled with only a 1.4% increase in overall test score it is not scientifically valid to conclude that blended learning caused this small gain.

4.5.3.2 Group A test-scores

Table 38. Group A Mean Test Scores

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ALB	27.66	201	5.813	.410
	ALA	31.12	201	5.995	.422
Pair 2	ARB	26.05	201	6.035	.425
	ARA	28.59	201	6.055	.427
Pair 3	ATB	53.71	201	9.970	.703
	ATA	59.72	201	10.693	.754

The mean scores for the A group (table 37) showed a significantly higher increase of 3.5% in the listening portion, 2.6% in the reading portion to give a total increase of just over 6%. The sample size in the A group was substantially larger which further amplifies the difference between the B group results.

Table 39. Paired t-test and p-test Scores

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	ALB - ALA	-3.462	7.879	.555	-4.558	-2.366	-6.230	200	.000
Pair 2	ARB - ARA	-2.542	8.652	.610	-3.745	-1.338	-4.166	200	.000
Pair 3	ATB - ATA	-6.004	14.164	.999	-7.975	-4.034	-6.010	200	.000

The t-test scores (table 39) did not show clear or significant results. On receiving the data after calculations, t-test scores were actually negative. On a closer inspection a logical explanation was found. The pre-test and post-test datasets for the A group showed very varied sample sizes. Also it was discovered that 15% of the total sample size from the pre-test were absent on the day of the post-test and around 5% of the total from the post-test did not sit the pre-test. This could be the reason for the negative t-test results. In future studies like this it is important to have equal numbers sit both the pre and post-tests.

4.6 Survey 2 results (Main-study)

These results were obtained during the same time period as those described above, but with a much smaller sample size of seven students. This course was designed to target intermediate level students as opposed to the elementary level in the pre-study. The overall average TOEIC score of students in this group was 450 and in general students who registered for this class not only showed higher levels of ability, they also typically showed higher levels of motivation. The class goal of this group was to raise TOEIC scores to 600 points. However, more importantly the objective was to raise students' awareness to technology and to encourage autonomous learning where possible.

Over the course of one academic year the seven students in this course were gradually introduced to various online learning programmes which incorporated similar tools to those in the pre-study but supplemented them with several others like wikis, and a greater variation in smartphone learning apps. The technology and tasks that were introduced to this group at the micro-level were remarkably more advanced than the tasks at the pre-study stage. As there were only seven students in this group individual student progress could be monitored more closely and support given where necessary. A pre-test and post-,test was administered in this study. Through the introduction of blended learning tools that became more advanced with time it was expected that students would become more autonomous and learn more independently. The majority of data obtained from this section was qualitative. This data was attained during the second semester of this course through three different data collection phases in week 5, week 10 and week 15 of the second semester and analysed using the KJ method.

A total of 8 qualitative based open questions were asked to the 7 participants at 3 different times in this case study (Appendix 2). The data collection stages were separated into three data phases, firstly, 5 weeks after commencement of the course,

then 10 weeks, and finally 15 weeks after, during the final class of term. Each student replied extensively to each question they were asked, providing answers of various lengths. These were collated, collectively compared and conclusions drawn for each data set. These datasets were then compared to each other with further observations made. The data collection phase for week 5 and week 10 provided 56 comments by 7 subjects, while week 15 provided 48 comments, by 6 subjects. As the subjects of this study accustomed themselves to the technological aspects that were introduced to them over time, they provided varied lengths of answers. However, there was no familiar pattern regarding the length of students' responses over time. Some students provided longer answers in the first data phase, while others provided longer answers in the second or third phases. All comments were separated for each data phase, then analysed using the KJ method.

4.6.1 The KJ Method

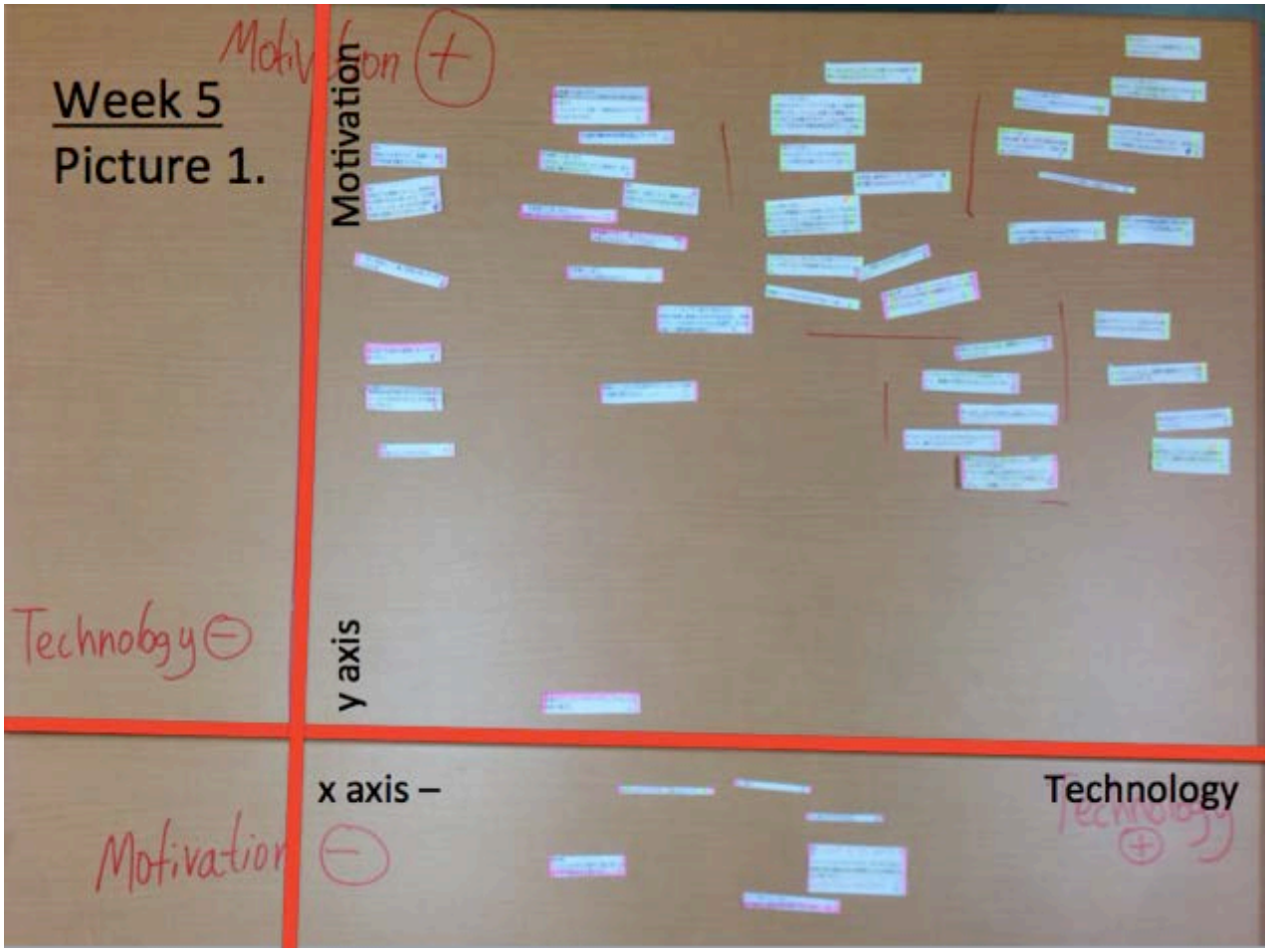
The KJ method is a well-known procedure used to analyse qualitative data. Named after its founder Kawakita Jiro in the 1960s, the KJ method is an inter-subjective approach to categorizing written discourse into clusters. The process involves separating all comments received into small segments printed on paper. These comments do not necessarily have to be all on the same question or written by the same subject, however they are all within the confinements of one survey. Once separated, researchers work together to categorize each of the many comments into clusters which correspond to similarities mentioned within each comment, either on the same theme or topic. After all comments have been organized into topics they are then labelled and positioned on an affinity diagram. An affinity diagram consists of a predetermined x-axis and a y-axis. These axes resemble two recurring themes with a positive and negative value. Any distance to the right the central point indicates a positive value whereas, any distance to the left indicates a negative value. The same rule applies for the y-axis. The two themes

allocated to this KJ method process were deemed technology for the x-axis and motivation for the y-axis. KJ method results will now be presented in consecutive order, starting with week 5 and ending with week 15 of the second semester.

4.7 Week 5

A total of 8 qualitative based open questions were asked to the 7 participants in this case study. Each student replied extensively to each question they were asked. Responses were of varied length. A total of 1,789 Japanese characters were received from responses to the 8 questions asked at this stage. All responses were originally received in Japanese, but then translated into English by the researcher for this paper, giving a total of 1,132 words in English. According to the KJ method analysis theory, all student comments were separated and arranged randomly on a large open surface. Every comment by each respondent was separated and distributed on an (cross with + & - x/y axis) affinity chart then separated into 9 clusters by an inter-subjective method. This method involved the researcher and his academic supervisor collaboratively agreeing on the location of each comment on the chart. The position of each comment on the chart referred to two major themes, ‘perception of technology’ and ‘motivation’ towards English learning. The x-axis refers to technology and the y-axis refers to motivation. A position right of the central region represents a positive perception of technology in the x-axis whereas a position to the left of the centre represents a negative one. A position above the central region on the y-axis represents higher motivation while below the centre would mean lower motivation. Picture 1 below shows the initial position of each comment for data collected in phase 1,

Picture 1. Affinity Diagram of Week 5 (semester 2) KJ Method Data



After a closer inspection, each individual comment was placed into specific categories through an 'inter-subjective' process. This process involved both the researcher and his supervisor working in tandem to locate each comment to groups that showed similarities. Each group of comments was then labelled. Factors that influenced the labelling of each cluster included the topics mentioned within each comment, the similarities observed either positive or negative and the combined nuance of each comment. There were a total of 56 comments received for this section of the data collection. These comments were categorized into 9 clusters. The 9 clusters varied in size and location on the affinity chart. Their position can be seen in picture 1 and the label for each cluster in table 38 below:

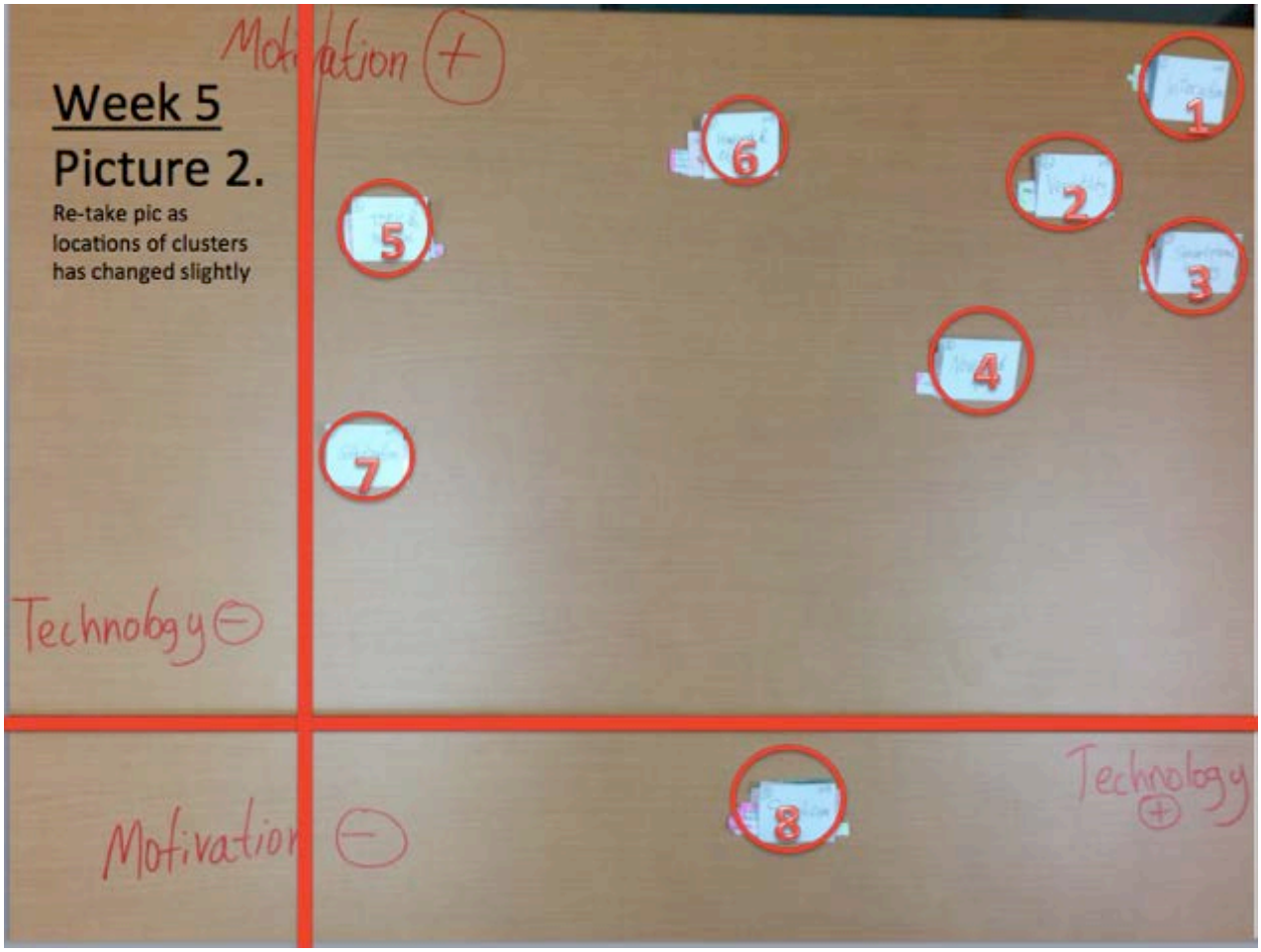
Table 40. Week 5 Response Cluster Titles

Cluster	Cluster title	Input	Black-box	Output
1.	Interaction	□		
2.	Versatility		□	
3.	Smartphone learning		□	□
4.	Novelty	□		
5.	TOEIC & Business			□
6.	Homework & effort, results	□	□	□
7.	Globalization			□
8.	Sceptical & class time (8 & 9 combined)	□		□

4.7.1 Discussion of Results (Input)

Picture 2 below shows the location of each cluster after their ideal position was located on the affinity chart. The position of each cluster corresponds to the collaborative agreement of the researcher and his supervisor. From this first stage of KJ method analysis, the following conclusions were made. Summaries of each cluster will now be made, highlighting specific comments where appropriate.

Picture 2. Week 5 KJ Method Cluster Locations



4.7.1.1 Interaction

In general, students in the initial data phase of this process have shown a strong liking towards using technology to enhance their learning experience. The first and most positive of all clusters was labelled “Interaction” and refers to the interactive experience that technology has provided learners regarding their foreign language study. This section included 9 comments in total all of which gave positive feedback relating a strong connection to technology and motivation.

Table 41. Cluster 1 – Interaction

Comment	Cluster 1 – **Interaction**
1	*Yes, I think they are. They (computers) make English more accessible and allow us to interact with English more online.*
2	*Yes I do. Computers and Technology help us to reach a level of English that we wouldn't normally be able to reach.*
3	*Yes, I think its good. Modern day computers and Technology are essential to our needs.*
4	*Yes, I do. Up to date computer Technology can help you to improve your English*
5	*Depending on the way you use it, Technology can definitely improve your English skills*
6	*Yes I think computers are very useful. Technology allows us to review certain points as many times as we want. Technology makes learning much easier this way.*
7	*Modern Technology not only improves the quality of learning but also helps us to stay motivated.*
8	*Yes I think so. T allows us to study anytime and anywhere we want.*
9	*Quizlet makes learning more fun.*

Students at this stage have displayed an understanding that technology can benefit their foreign language gain by providing the opportunity to interact with it and other users online for their foreign language gain. Comment 1 mentions two key words associated to technology and the influence it has on their learning, accessibility and interaction. The element of interaction that technology provides the learner is quite evident here. Two more similar comments also recognise the value of technology in providing autonomy to the learner. These remarks help to highlight the element of freedom that students have over their learning. Comments 6, 7 and 8 all give very clear and clearly express the values of technology that students perceive after the initial 5 weeks of using new online learning tools.

All the above comments provide a very positive outlook of technology and show, as yet a decisive consideration of technology in learning. Subjects have acquired an improved understanding of the connection between technology and English learning. Subjects here have shown a strong awareness of technology and the benefit that it can have on learning English. There was also an improved perception of the autonomy that technology can offer the language learner and the link to motivation that it permits. A

total of nine comments from seven students were placed in this group. Collectively, comments here suggest that students acknowledge and understand the importance of technology in future learning and the opportunities it can provide in English learning.

4.7.1.2 Versatility

Similarly, a total of nine comments were placed in this category. Subjects here collectively agree that technology provides the versatility to learn anywhere and anytime outwith the confinements of the classroom. The general familiarity between comments here also emphasizes the element of change that technology is having on their learning. It seems that the new way of searching for words, creating word lists and learning digitally is appealing to this small group, and can not only benefit their learning but also be enjoyable. The novelty of learning in this new way appears appealing to this group, however they still do not appear to be completely convinced that technology can provide more positive results than the traditional F2F learning that they are more accustomed to. The position of this cluster of comments on the affinity graph, shown in picture 2, indicates high regard of technology, but perhaps a lesser influence on overall motivation.

Table 42. Cluster 2 – Versatility

Comment	Cluster 2 – **Versatility**
1	*Through using Quizlet and Dyned I am getting better at studying. My speaking has also improved.*
2	*I have become much better at using the internet to find the meanings of words.*
3	*I have become much better at using the net to find out meanings of words. I also use my smartphone to review words while on the bus or during my spare time for short periods.*
4	*The simplicity and ease of use of computers and technology are very helpful*
5	*I think technology and computers can definitely help as they become more available and prominent in our future lives.*
6	*I am now much more proficient at learning English through the help of many websites I was introduced to.*
7	*I think computers and technology can help. Since becoming a university student I have been using computers to do my assignments and study with far more than pen and paper. Its much easier and versatile to study with computers, as a result I now submit most of my assignments on time.*
8	*Yes I think C and T can help. Textbooks and notebooks are heavy and not very motivational, but my smartphone is always with me and provides me with a new way of learning. Technology provides us with more opportunities to learn than before.*
9	*Technology has introduced me to a new way of learning and put me in contact with a lot more English than before.*

Comment 7 above may possibly be the most significant of this collection. The most prominent area of interest in this remark is the element of change that technology has had on their learning. The fact that technology can provide greater opportunities to learn is very influential for this entire project. Similarly, comment number 9 also reiterates the notion of change.

Likewise, comment numbers 4 and 5 both mention another two interesting points, the level of simplicity and prominence that they have. Computers, and a lot of the modern learning tools that target language learners are incredibly easy to use and available in society today. As learners have more and more contact with them they can easily accustom themselves to their use. Computers now are also a lot more affordable than they were formerly.

4.7.1.3 Smartphone Learning

This cluster of comments contained five comments all of which appeared to show a very positive attitude towards using smartphone technology to learn English. At this stage the small group of students in this study have shown very positive reactions to using their smartphones to learn. However, from these comments there is an element of uncertainty surrounding their continued use for learning. Smartphones were still relatively new at this stage (summer, 2013) and still very few English learning applications were available. Nonetheless, students were in favour of their use but not entirely convinced they could completely replace their current learning styles.

Table 43. Cluster 3 – Smartphone Learning

Comment	Cluster 3 – **Smartphone Learning**
1	*I use Quizlet and a few other apps for learning. I can learn anywhere and any time I choose now with the help of these smartphone apps.*
2	*I use the internet more now for learning than I did before. I use my phone 2-3 times a week for learning.*
3	*I can confirm the meanings of what I have learnt outside of class in my own time when I take a class. I think both are necessary.*
4	*I study now because I know that learning English may be helpful in my future.*
5	*I use my smartphone to study for this class a lot. I use it for Quizlet, Dyned and sometimes to watch English news. I use Dyned about once a week and Quizlet during any spare time I have.*

Two particular tools that were used for this class, Quizlet and Dyned were both mentioned in this cluster. Dyned is an e-learning software that also has a mobile application allowing students to study independently in a similar manner to Quizlet. Quizlet, in particular was referred to several times. From these three comments we can conclude that students like learning with smartphones as it gives them an alternative way to learn than what they may be used to. However, students at this stage do not appear to be completely convinced that technology can motivate them to learn more English.

4.7.1.4 Novelty

This section comprised of four comments and has a very similar notion as the cluster above titled ‘smartphone learning’. The common similarity between each comment here was the novelty of learning in a new and modern way that students may not already be used to. However, the major difference, which can explain their alternative positions on the affinity graph, is the uncertainty surrounding the suitability of using smartphones for learning. Similarly, students in this group show an understanding of the importance of computers and technology in future learning through online resources and mobile applications such as the ones introduced in this class. Students seem to be very much in favour of using smartphones especially when using them for completing them to reach class goals. However, it seems that this small group of learners are not yet accustomed to this style of learning hence the lower position with regards to motivation on the affinity diagram. Hopefully this will change over time.

Table 44. Cluster 4 – Novelty

Comment	Cluster 4 – **Novelty**
1	*Yes I think computers and technology can help learners of English in Japan. English and technology are tightly connected and both are becoming more accessible through computers.*
2	*Computers and technology provide a new way of learning English for people in Japan.*
3	*Yes I think c and t can help learners in Japan. With the further development of technology English will become more essential for society. We have to learn English to keep up with the advancement of technology.*
4	*I now use Quizlet for learning new words.*

Comments 1 and 2 illustrate an interest in technology and the learning of English through computers. They also imply that with time, computers and technology will have a greater impact on society and it is beneficial to learn how to use them efficiently now for a future which will inevitably be further saturated with technology. These two simple comments also suggest that subjects understand their importance, the novelty of using them now may transform into a necessity in society in the not so distant future. However,

students at this stage do not appear to be completely convinced that technology can motivate them to learn more English. This impression is further reflected by the position of this cluster on the affinity diagram, picture 2. Although comments here are all indisputably in favour of technology there is still a feeling of doubt, as the comments do not elaborate further. Its position on the x-axis is still very high whereas the y-axis is slightly lower than the previous 3 clusters.

4.7.1.5 TOEIC & Business

Cluster number 5 encompasses 3 comments all of which are related to the TOEIC test. Students at this stage realize the importance of the TOEIC test in their English learning careers, particularly as it is the major theme of this class. TOEIC is frequently referred to in the English education industry in Japan and continues to appear in the foreign language curriculums of universities nationwide. Unlike other English classes students may be accustomed to, this class has more succinct goals, the most fundamental of which being to raise student TOEIC scores. Although only 3 of the comments collected here made mention of TOEIC, students overall have shown an understanding of this critical point. One comment below even suggests they would like to improve their TOEIC score not only to secure employment but also to improve their general English to work abroad.

Table 45. Cluster 5 – TOEIC and Business

Comment	Cluster 5 – **TOEIC and Business**
1	*I would like to improve my TOEIC score to help me find a job and eventually live and work abroad.*
2	*I realize my English level is improving when I recognize words learnt in this class that appear in other classes and the importance of vocabulary.*
3	*I would like to take the TOEIC test as I know that English will be important later in life.*

The first comment above suggests an understanding of the existence and value of what gaining a good TOEIC score can do to their university career. This comment also

implies that gaining a good TOEIC score can greatly improve their chances of living abroad some day. The other important concept of this section is that students recognise how important TOEIC can be to their long-term English learning experience. Although these three comments reflect an enthusiasm to learn there is no explicit mention of technology. Their position on picture 2, is towards the top of the y-axis and only marginally in the positive zone of the x-axis.

4.7.1.6 Homework and Effort

Cluster 6 was titled "Homework and Effort" and comprised of 9 comments. Similar to cluster 5, subjects here show an understanding of the importance of homework and effort with regards to results. Likewise, they realize that computers and technology can help them reach their goals, but appear slightly apprehensive as they may not be used to this new way of learning. Comments in this group distinctively emphasize motivation and effort with regards to results. The position of this cluster on the affinity diagram in picture 2, is half way along the x-axis of technology and largely towards the top of the y-axis. This indicates a high level of regard towards effort, but slight apprehension towards the use of technology to achieve these goals at this stage.

Table 46. Cluster 6 – Homework and Effort

Comment	Cluster 6 – **Homework and Effort**
1	*I sometimes read foreign articles in English online.*
2	*Yes I do plan on continuing my studies after graduation. At university we learn English skills for our future, if we don't plan on using English in the future it would be pointless to learn in the first place.*
3	*I believe that effort equals results.*
4	*I think that homework is important, learning new vocabulary at a pace that suits me is very important. Technology allows me to do this.*
5	*By doing the assignments for this class I have had the opportunity to learn a lot. All the websites introduced by the teacher in this class have helped.*
6	*Homework and effort helps to improve our overall level of English*
7	*Yes I understand the importance of homework. Homework is necessary to learn, to motivate us and is proportional to end results*
8	*By doing homework and trying hard our English level will improve*
9	*By doing my homework diligently I now understand more in the listening and reading tasks in class.*

This class incorporates a substantial amount of homework each week, a lot of which focuses on the blended learning element of the course. Homework each week requires students to actively build on their vocabulary lists using the digital flashcard tool Quizlet, either online or with their mobile device. Students are also expected to work on several other online tools including Wikispaces.com, newsinlevels.com and simplenglishnews.com, all educational based learning tools that were introduced to students at an early stage in class. It seems that students are well aware of the value and meaning behind the time and effort put in to these online learning tasks. Consequently, students essentially recognize that the amount of time and effort put into these tasks is proportional to actual results in class and an improved overall output. Effort corresponds to improved results, which in turn can maintain motivation. Effort is a key element in the ultimate goal of garnering the autonomous learner. These comments suggest that students understand this crucial factor.

With regards to these comments, several further conclusions can be made. Comment 4 utters the expression “at a pace that suits”. This highlights the freedom that they are allowed to complete their goals in a manner that suits them. Comment 5 mentions a liking for “all the websites introduced in class” while comment 7 remarks on the topic of motivation and results. If homework at this stage can help to maintain motivation and improve results then the transition towards autonomous learning is far more achievable.

4.7.1.7 Globalization

Cluster 7 was named “Globalization” and composed of just 3 comments. All comments within this section made some remark towards the importance of English on the global stage. It goes without saying that English is the lingua franca of the

modern world and you must be able to speak it to some degree to succeed abroad. Students have shown an understanding of this point.

Table 47. Cluster 7 – Globalization

Comment	Cluster 7 – **Globalization**
1	*Yes I plan on continuing my English study after I graduate. I like to study foreign languages.*
2	*Yes I plan on continuing my English studies after completing this class. I would like to travel abroad in the future.*
3	*Yes I will continue to study English after I graduate. English is a very useful language to know especially during the current trend of globalization.*

These comments are all direct answer to the final question of the survey (Q8), see appendix 2: Which asked of students' intention to further their English studies after completion of this course. Both demonstrate an understanding of the importance of English in the globalized world of today. Here it is evident that these three students are motivated enough to want to continue learning after graduation a point that emulates the position of this cluster towards the middle region of the y-axis. There was no mention of technology within this cluster, and as a result was place in the neutral zone of the x-axis.

4.7.1.8 Scepticism

The final cluster that was created for all results at this stage was named "Class Time" and consists of 7 comments. The discourse in this section is quite different to the general positive trend of comments so far. All of the comments in this section utter some form of scepticism to learning with technology and the alternative style of learning that it incorporates. Comments in this section all similarly highlight student perception of class time and the importance of the classroom-learning environment. Technology in the form of smartphones, Internet and computer-based learning has made a great impact on the students in the study at this stage. All these factors including the amount of time and effort used to adapt them in their learning regime

can aid their motivation to learn. However, the role of the teacher and interaction with the teacher is still vital. Students value F2F teaching time and are still not completely confident in using solely their electronic devices and technology to learn independently.

Table 48. Cluster 8 – Scepticism

Comment	Cluster 8 – **Scepticism**
1	*Computers and technology can only help a little*
2	*Computers and technology can only help a little*
3	*I think smartphones are good, but I think we can learn more during class than independently. There is more opportunity to speak in class and it is more effective for learning in my opinion.*
4	*I don't use my smartphone for learning English*
5	*I am an experienced smartphone user and haven't yet used it more for learning in this class.*
6	*Maybe, I am not certain if I will pursue a career that needs English yet.*
7	*My way of using my smartphone has not changed any since joining this class. Sometimes I check my homework on my phone, but that is it. Other than that I only use my phone for private purposes.*

The position of this cluster on the affinity diagram is shown in picture 2. This is the only cluster located in a negative area regarding its general stance towards motivation. Nonetheless, there is a decisive general attitude towards technology expressed by these comments which can explain its definitive location slightly off the central region of the x-axis.

Here students show an understanding of computers and technology and that they can collectively help, but do not unequivocally think that computers and technology can help their learning. Students here seem to acknowledge the potential of computers, but appear sceptical that they can help their learning.

Most comments here suggest the value that students perceive of class time and how important the role of the teacher and attending class is to their learning. Comments 4, 5 and 7 all suggest that although students are experienced users of technology they are still not confident in using technology per se, to benefit their foreign language learning.

Comments 1 and 3 above both clearly show apprehension towards using technology for learning with in an English class. All of these statements imply a preference to learning without technology and a preference towards the traditional ways of learning in an average F2F class environment. A further conclusion can also be made from these remarks. Students, at this stage have not made the transition to using their mobile devices for their learning and instead prefer to use their mobile technology more for personal benefit. Hopefully this notion will change over time and students will realise the power and support that mobile technology has to their learning. The next section of results will assess the learning process that students have shown, up to this stage.

4.7.2 Black Box region

Every class for this study was held in a computer room, with one personal computer per student operating on “Windows 7” OS. During the first 3 weeks of term, all 7 students in this study were introduced to several online educational tools using classroom PCs. With time, the tasks students were expected to achieve with these tools became slightly more complicated. The first online learning tool that was introduced was the aforementioned online, digital flashcard programme Quizlet (www.Quizlet.com). Students were expected to add 10-15 words or vocabulary items with a direct translation in Japanese, and where possible a visual aid comprehension. Every word had a digital, native-like pronunciation first in the target language, English (L2) and then the mother tongue (L1) of the students. Students were then expected to edit their lists and review words in that list as often as possible. Each word added to this list was from any source students desired, although most students used the two class textbooks as this source.

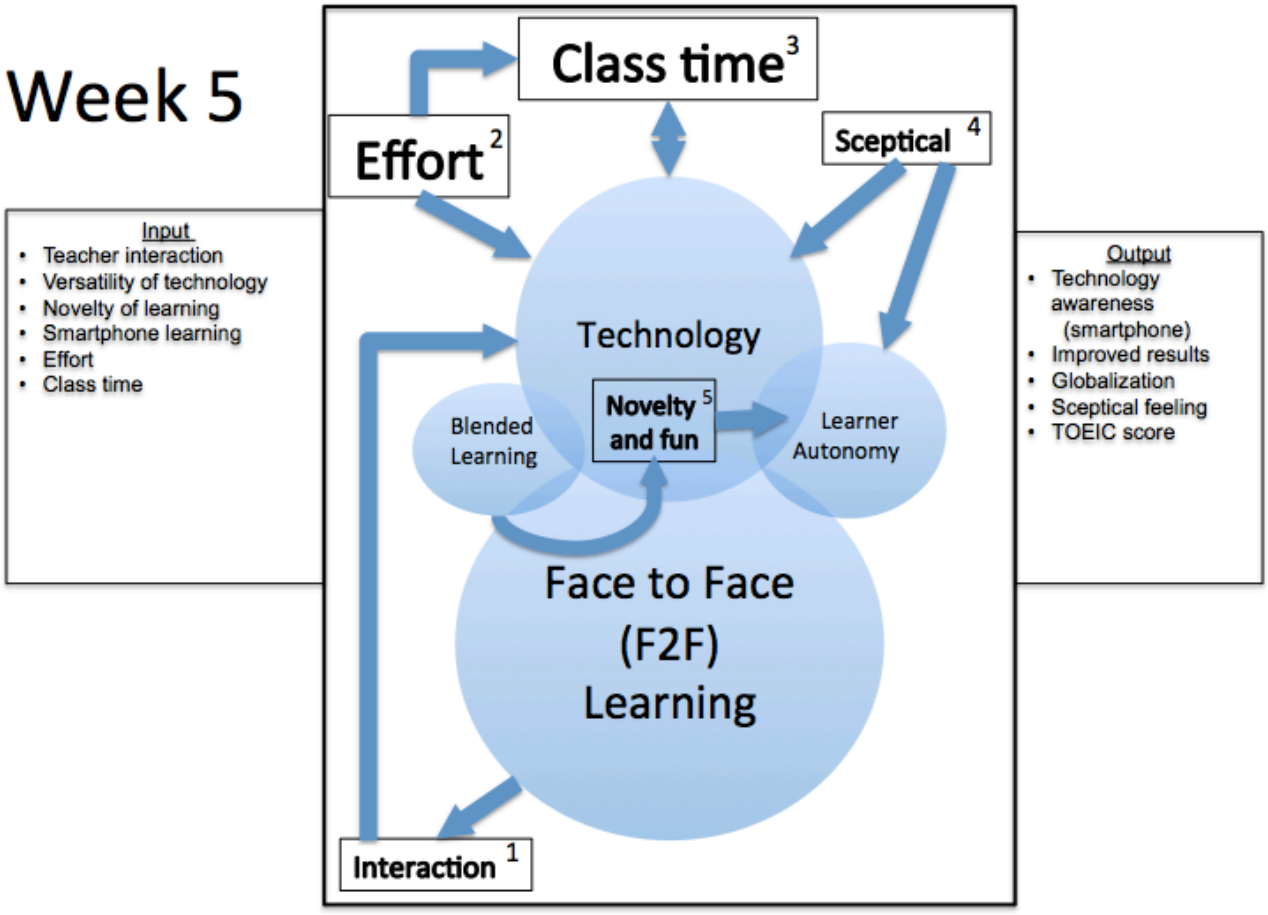
Another online educational tool that was introduced to students during this stage was called wikispaces (www.wikispaces.com). Wikispaces is an online educational programme that allows users to create wiki pages. A wiki is an online web application that allows collaborative modification, extension or deletion of its content by any user with an access code (wiki reference). Each student was provided with the same login details, but each created an individual wiki page within that account. Students in this class all had complete access to all material added to each page on any computer with an Internet connection. Quizlet and Wikispaces were the two main blended learning tools that students were expected to use in the first 5 weeks of this 15 week study.

During this short time frame a wiki account was created and students were expected to complete part 1 of their wiki-project. Part 1 of the wiki-project involved students adding 4 pictures to their wiki-page and describing each one with 4 simple sentences. All blended learning tasks up to week 5 were quite simple and required very little computer knowhow to complete. For students to complete these tasks there was initially a lot of teacher interaction as each tool was described in detail and individual support given where necessary. As students progressively had more contact with both Quizlet and Wikispaces, overall efficiency of use improved and tasks were completed as requested. Further detail will now be described of the student learning process.

Blended learning, in the form of using technological tools, websites or smartphone applications, is evident at this stage as students suggest the element of fun and enjoyment that it brings to their learning. Comment 9 in cluster 1 of this data simply states that: “Quizlet makes learning more fun”. Students at this stage seem to show initial enthusiasm for learning with technology and understand the practicality and wide potential that it provides. Typically though, students are unfamiliar with using

technology to learn, hence the relatively small size of the blended learning and 'learner autonomy' zones within the black box in figure 12 below.

Figure 21. Black-Box Learning Process for Week 5 KJ Method Data



This simple flow chart symbolizes the relevance of each of the four factors related to this study. Each factor, F2F learning, blended learning, learner autonomy and technology was characterized by a sphere. The alternating size of each sphere relates to the influence each of the four factors had on the student. A larger sphere would indicate a greater influence and higher level of importance from the students' perspective, than a smaller sized sphere.

The novelty of learning in this new way appears appealing to this group, however they are still not completely convinced that technology can provide more positive results than the traditional F2F learning that they are more accustomed to. The largest zone represented in the black box area is 'F2F teaching' followed by the 'technology' zone. This implies that students still regard teacher interaction and class time as a vital role in their learning. Through F2F learning, students are introduced to

new learning methods that utilize technology, which garners a lot of interest. Students appear to show high regard for teacher interaction during class time. This relationship is indicated by the arrow towards box number 1 titled 'interaction' referring to the teacher as a valuable source of knowledge to provide support of new aspects of technology. Through this vital relationship, students value class time, (box 3) and effort as a precondition to improved results at this stage. The size of the 'technology' zone is still marginally smaller and less significant than F2F class time. The reason for this is the apprehension that some students showed, particularly with reference to cluster 8 titled 'scepticism' labelled as box number 4 in figure … Finally, the novelty and element of fun that students associated with the new blended learning aspect of the course may help to maintain motivation which may then supplement the smooth transition to autonomous learning.

4.7.3 Output region

The output at this first stage of data collection is an increased awareness of technological enhancement tools and a new perspective on learning. Through the repetitive use of said tools, learning output has shown signs of improvement. At this stage students have become well aware of the potential their smartphone devices have as a learning tool. They have also recognised that the more they use and become accustomed to these technological tools the more influence it will have on TOEIC scores and results in class. Another distinct observation is the relation to technology, globalization and the English language yet there still remains a little scepticism as to how beneficial learning in this way can be.

Students have also shown an understanding of the prominence of technology in future learning and the importance of English to their future careers and the global economy. Despite only having minimal experience with technology, students here have already noted a self-improved TOEIC score and comprehension when taking in-

class practice tests. Output of students at this stage although evident, is minimal. With time, it would be expected that output performance and confidence in using blended learning tools will develop. The next phase of data collection will now be introduced.

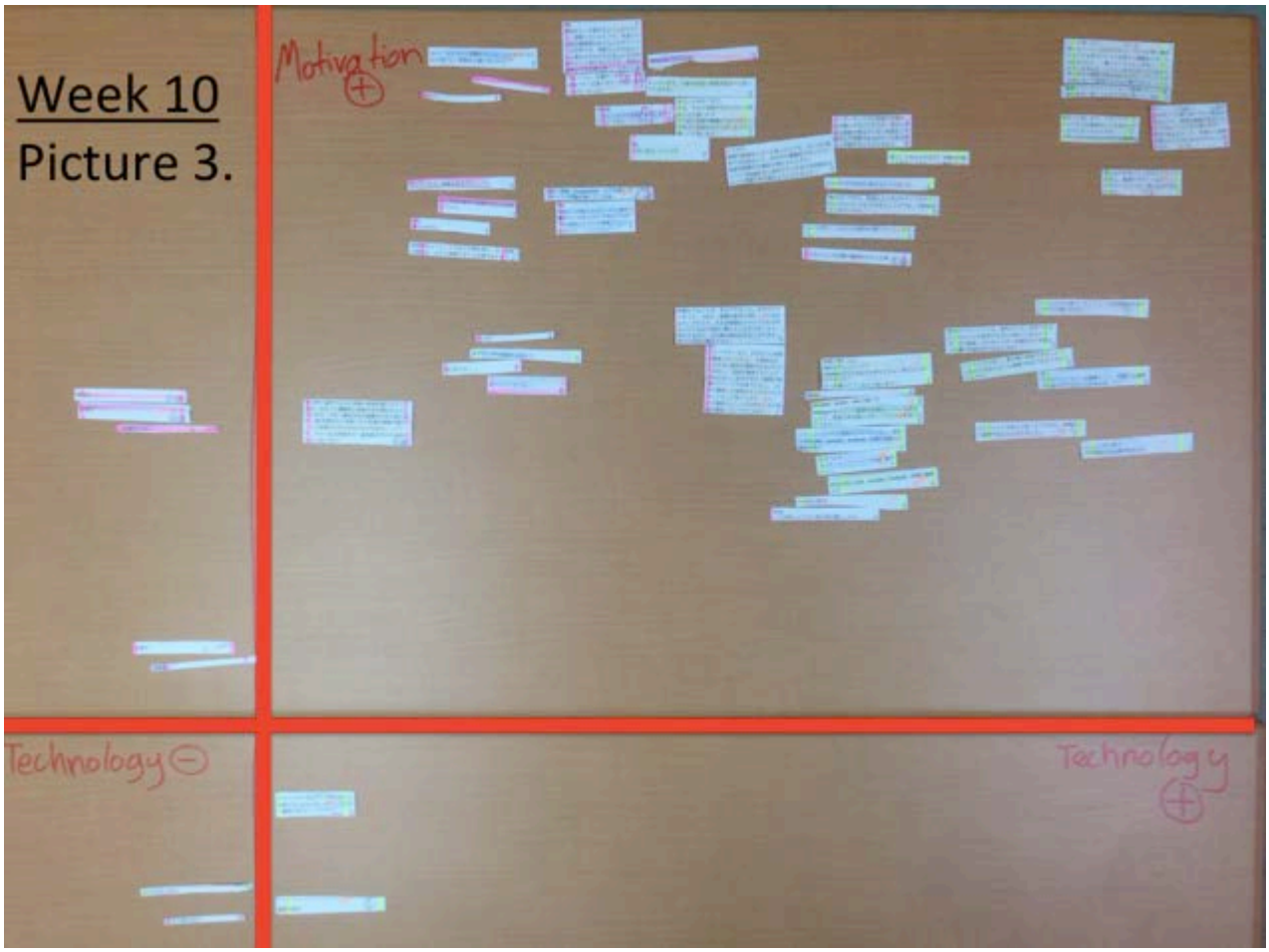
4.8 Week 10 Analysis

Table 49. Week 10 Cluster Analysis Titles

Cluster	Cluster title	Input	BB	Output
1.	Smartphone versatility	○	○	
2.	Computers and technology	○		
3.	Progress & results			○
4.	Future career			○
5.	TOEIC test			○
6.	Satisfaction and enjoyment		○	○
7.	Self-efficacy			○
8.	Online learning tools	○	○	
9.	Effort and success	○		○
10.	F2F learning		○	
11.	Teacher interaction	○	○	
12.	Motivation			○

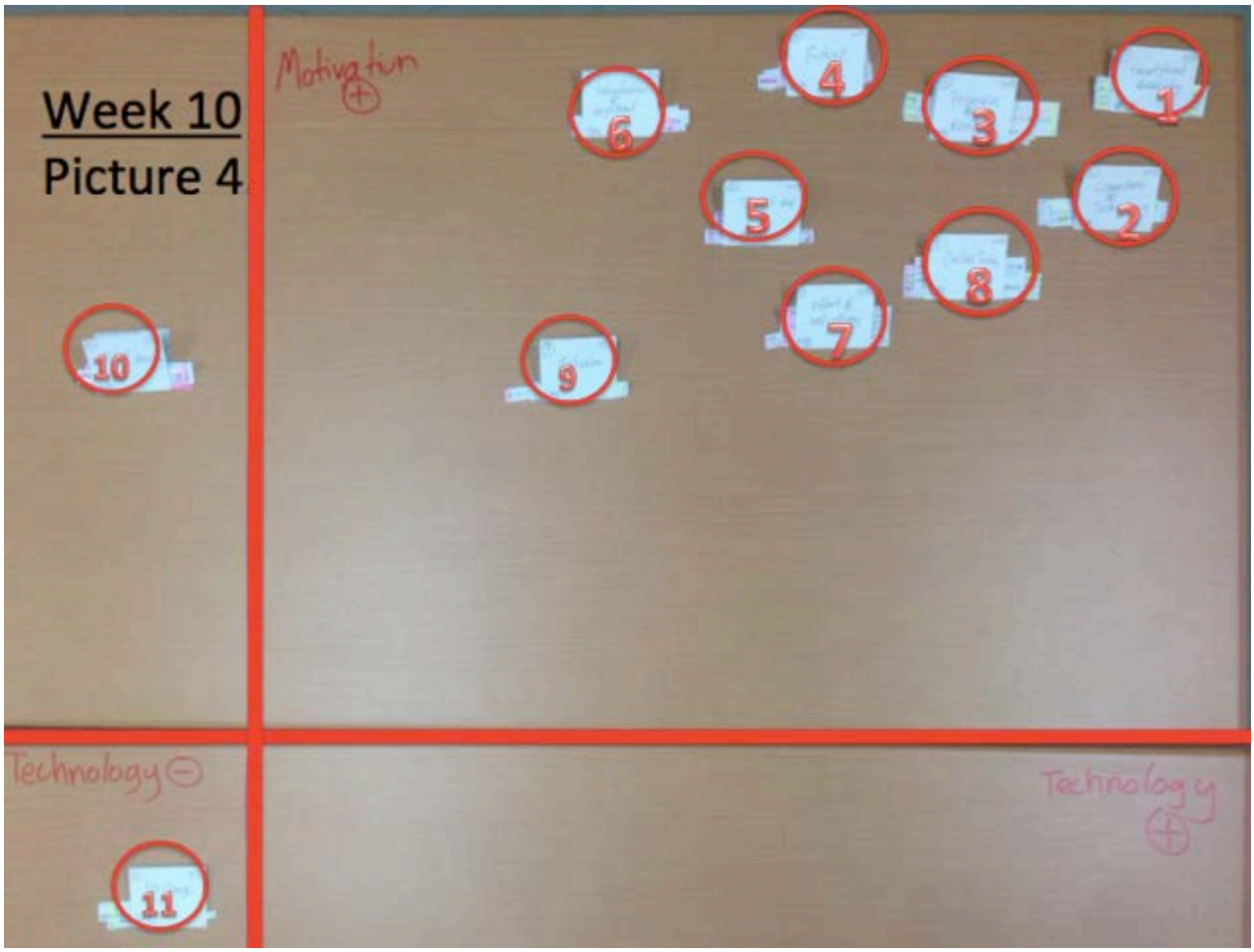
There were a total of 2,300 Japanese characters received from the same 8 open-ended questions in this section. Seven students provided a total of 56 responses to these 8 questions giving an average of 41 Japanese characters per comment or 1,532 words in English, an average of 27 English words per comment. Of the 7 subjects who co-operated with this study, 4 provided more elaborate answers, while the remainder three showed no substantial change in the detail of the answers they gave. Incidentally, two of the four (S6) subjects who gave more detailed answers than in the first survey showed considerable changes. Student 6 showed an increase of 182%, a gain of 388 characters while student 2 (S3) showed an increase of 101% rising from a response totalling 410 characters to one of 824. All of the 56 comments were individually placed in the affinity diagram, which can be seen below in picture 3. An overall majority of the comments were in the positive zone.

Picture 3. KJ method Affinity Diagram Analysis for Week 10 Survey Data



Almost all clusters collected within this time frame showed positive results. Of the total of 12 clusters that were created, more than 80%, or ten out of the 12 were positioned in the positive section of the chart (see picture 3). This positive outlook obtained tells us two distinct outcomes. As a whole, all the students in this class favour the use of technology in their English language learning. What's more, the majority of students have also expressed the positive impact that computers and technology can have on their overall motivation to learn English. The repercussions of this indisputably show favourable outcomes. A more detailed account of each cluster, the learning process and output changes of the students will now be discussed.

Picture 4. KJ method Affinity Diagram with Cluster Location for Week 10



4.8.1 Input

Comments at this stage of the data collection phase asked the same questions as in the first stage, 5 weeks previously. However, students here will have had an extra 5 weeks to accustom themselves to the various learning tools, smartphone apps and online tools that were introduced at the start of the semester. Overall comments suggest an improved understanding of technology and online learning. An improved understanding of technology and its benefits are reflected in the actual student comments and confidence through the analysis of these results.

4.8.1.1 Smartphone versatility

There were a total of 4 comments comprising this cluster section. This cluster of comments has the highest regard of technology and shows the highest level of motivation towards learning English. The location of this cluster in the top right hand area of the affinity diagram reflects the high regard for technology on the x-axis and also expresses a high level of motivation, in the y-axis. In this section, students have shown a high understanding of the benefit that technology can have on their learning. This zone is possibly the most significant area of this graph as both motivation and technology understanding are at their highest points. Another interesting point of this section of results is the average length of comments provided. The total number of Japanese characters in this section amounted to 365, an average of 91 per comment. When translated into English this gave a total of 227, or an average of 57 words per comment in English. This figure is substantially above the overall average of 41 Japanese characters, or 27 English words per comment.

This point alone is vital and can be further analysed from two perspectives. Firstly, from the motivation perspective this suggests that students are interested and motivated to learn English through digital mediums such as digital flashcards and other English language learning tools introduced in this class. Secondly, from the technology perspective this also suggests that students enjoy using the technology that they are used to, to learn for this course. Enthusiasm to learning with smartphones is another important outcome of the results at this stage.

Many students commented on the versatility and freedom that studying with their smartphones provides. From comments placed in this cluster, it can be seen that students enjoy the freedom that learning with mobile technology has and the enjoyment it brings. Comments that reflect this notion include the following:

Table 50. Cluster 1 (week 10) – Smartphone Versatility

Comment	Cluster 1 – **Smartphone Versatility**
1	*Yes, I think computers and technology are useful for learning English. Although I have a computer at home and there are many available at school I still use my smartphone more than anything to learn with. My smartphone is instant and doesn't take time to boot up, unlike a computer plus I can use it anywhere and anytime I like. I think it is also important to study without computers, but the constant availability of my smartphone and the potential it has for learning cannot be overlooked. With my smartphone I feel closer to English than I ever have before.*
2	*It's great that there is a system that can help us remember and learn new words and support our English study. Computers and technology can be very useful in this regard.*
3	*I think computers and technology can definitely help English learners in Japan. English has become a lot more fun and easy to study with the help of computers and technology.*
4	*Yes, I think that computers and technology are a great way to learn. Our smartphones are always by our sides and continuously available. I think it is amazing that we can use them to learn English with. It is precisely because they are so available that we can casually use our smartphones to get exposure to English. I think this is wonderful.*

Comment 1 above provides several key observations. This student confirms their use of their smartphone for learning in preference to a computer. This student also mentions an affinity towards the versatility that a smartphone provides and declares that such modern technology cannot be disregarded in education. Although, the most remarkable of all is the final sentence where the student remarks on the proximity to English that the smartphone enables.

- *With my smartphone I feel closer to English than I ever have before.*

Similarly, comment 2 remarks on the convenience and versatility that learning with a smartphone can provide. However, more importantly this comment provides a very positive outlook in using computers and technology to learn with and support learners of English in Japan.

Subsequently, this final comment in the same cluster group, also refers to the versatility that learning with smartphones provides. The most

emphatic remark in this third comment could be the use of the word available which appears twice. The first instance refers to the general availability of smartphones as tangible devices that most young people possess these days, whereas the second instance refers to the availability of English resources on these devices. All three of these comments appear to show a high level of enthusiasm to learning with smartphones as they are always available and offer instant exposure through an audio or visual means.

4.8.1.2 Computers and Technology

This section of results comprised of 6 comments all of which were closely related to the general usage of computers and technology. This section focuses on the benefit that computers in general can have on student learning skills. From this section it can be seen that students have a good comprehension of the positive attributes that computers and technology can have on their learning. The first comment in this section mentions how computers and technology are an essential part of modern day education and society in general. What this implies is that learning a foreign language with them not only makes sense but also provides users with equal opportunities to English resources available on the world wide web. The second comment mentions the convenience that computers bring to the language learner. This student also shows an understanding of the varied contents that technology and the internet can provide.

Another recurring theme within this dataset is the notion of 'future learning'. Comments 3 and 4 below in particular mention the topic. Comment three suggests that technology can help to improve English levels now to benefit future careers. Comment 4 however, suggests that by learning more with technology now students

can prepare themselves better for a future which will inevitably be saturated with technology.

Several comments also mention “the future of learning” and how computers will be an indispensable part of learning in years to come.

Table 51. Cluster 2 (week 10) – Computers and Technology

Comment	Cluster 2 – **Computers and Technology**
1.	*I think computers and technology can help with our learning. Computers and technology are indispensible to modern society and the way we learn.*
2.	*Modern technology is very convenient and we should apply our upmost energy in utilizing it for our benefit. Accordingly, computers can help us to study more varied contents than without using computers.*
3.	*I think the technology of today is amazing. It can definitely help us to improve our future English levels.*
4.	*By learning with cutting edge technology we can prepare ourselves better for future learning. Technology and English are interconnected and will both become more and more significant in the future.*
5.	“Yes, I think computers and technology are very useful for learning English. After all, computers and technology are the future of learning.

The location of this cluster on the affinity diagram in picture 4, is very similar to that of cluster 1. There is a high regard of technology and a general positivity of its use to learn with, but there is less of an emphasis on the motivational aspects it can provide. Due to this last point it is slightly lower on the y-axis compared to the first cluster above.

4.8.1.3 Progress and results

This cluster contained a total of 6 comments all of which referred in some way to their own individual progress. Students here have shown an understanding of the individual progress they have made through the onset of computers and technology in class and independently. As both progress and results are integral to overall satisfaction and motivation this section of

results was crucial. All of the comments below show a comprehensive appreciation to learning with technology and each one mentions, in some way how it has improved their performance in some way.

Table 52. Cluster 3 (Week 10) – Progress and Results

Comment	Cluster 3 – **Progress and results**
1	*There isn't any new computer skill I have learnt so far in this class, however I have learnt of a few new websites I never knew of. Wikispaces is a great website and provides a very effective way of learning collaboratively.*
2	*I think computers and technology can provide an excellent new way of learning. It is difficult to meet real native speakers of English in person, but the convenience of the internet provides us with the opportunity to listen to and read real English, which would be very difficult to experience otherwise.*
3	*Learning English through technology and the internet is without doubt a very effective way of learning. Through the internet I can learn at my own pace, revise words I am not sure about and concentrate on English that I do not know. I would say using computers and the internet to learn is a very efficient way of learning another language, especially for people in Japan.*
4	*I realized my way of learning has improved when my accuracy rate in Quizlet improved.*
5	*I realized that my way of learning has improved since I started using Quizlet. I am much better at using Quizlet now.*
6	*I like to do my homework. I am not very good at motivating myself to self-study, so I enjoy doing the assignments that our teacher gives us. Our homework assignments give me a good opportunity to learn English. I especially like using Mreader. Since I started using Mreader I can now understand the books that previously I could never understand.*

The location of this cluster (picture 4), is again very high on the y-axis scale and still moderately high in the x-axis when compared to that of clusters 1 and 2. The reason for this change is partly due to comments 1 and 6 below. Comment 1 suggests that this individual has not learnt any new computer skill in this class to date while comment 6 suggests that they are not good at motivating themselves to self-study. However, both comments 1 & 6 also mention of the advantages that technology and computers have had on their learning thereafter. Comment 1 mentions the website *Wikispaces* and how through the learning platform that it employs, they have learnt the values of collaborative learning. Comment 2 suggests

the invaluable resources available to them on the Internet and how it can provide them with real written and spoken English without physically going to the country where it is spoken. Comment 3 states the perception of independence in how the Internet and mobile devices allow learners abroad to learn autonomously at a pace that suits them. Comments 4 & 5 both mention how Quizlet accuracy rates have improved while comment 6 mentions the topic of extensive reading in the form of Mreader, the graded reader database that assess comprehension of basic English literature.

4.8.1.4 Future career

In this section there were a total of 6 comments all of which seemed to reflect upon their learning experience with regards to their future careers. Students seem to show an understanding of the importance of English to their future endeavours. They also show an understanding of the role that computers and technology have with regards to this. Homework and individual effort toward obtaining their class goals, reflect their level which in turn can influence their future careers. These are the 6 comments that were observed at this section:

Table 53. Cluster 4 (week 10) – Future Career

Comment	Cluster 4 – **Future Career**
1	*Yes, I am interested in continuing to learn English. English will definitely be useful to me at some time in the future.*
2	*Yes, I do the homework because at some time or another English will definitely be useful to me. I do the homework to improve my English.*
3	*I don't know if I will continue to learn English. I am not sure if I will need English in the future or not.*
4	*Yes, I plan on using English more in the future. I want to improve my reading and my comprehension skills in English. In the global world that we live in, English is the main language used for exchange between foreign countries. This emphasizes the need to improve our English skills. There are many businesses and industries that require a good command of English. Even in Japan, several companies hold their company meetings in English, which I think highlights the importance of learning English for us in Japan.*
5	*I do the homework for this class to improve my English.*
6	*I think computers and technology can be very helpful in learning English for people in Japan. People in society today are at a disadvantage if they cannot speak English well. Doing class assignments and learning autonomously to improve our English is not for our immediate gain but for our future as we will be at a disadvantage if we cannot speak English well.*

The general consensus of these 6 comments is that there is a profound respect for the English language. Ultimately, students understand the importance that progress with their language ability has in enhancing their future potential. The students in this course were all 2nd year students at the time of this study and were in the process of thinking about their future careers. In Japan, it is common for university students to start their job hunting process in the 3rd year of study. Often students here have already decided on an employer before they graduate at the end of their 4th year of study.

It is plain to see from these comments that students also understand the value that homework has on their ultimate learning and progress in the language. Comments 2, 5 and 6 all mention the sentiment towards homework and how effort outside of class can enhance their future potential. There is a collective perception that technology can help people to learn English and English can help them to find a job. Comment 6 makes this astute point very clearly: "*Doing class assignments and*

learning autonomously to improve our English is not for our immediate gain but for our future as we will be at a disadvantage if we cannot speak English well."

4.8.1.5 *TOEIC test*

There are just 2 comments in this section, both of which refer to the TOEIC test and how gaining high results is one primary learning objective.

Table 54. Cluster 5 (Week 10) – TOEIC Test

Comment	Cluster 5 – **TOEIC test**
1	*I realize my English is improving when I read news articles on the web, from "the Guardian" and also when I get more correct answers on the TOEIC test.*
2	*Yes, I plan on continuing my English study after this class. I would like to work abroad, and as a result increase my TOEIC score. Also in the modern business world of today English is an essential component for success.*

The stance towards English in these two comments is very similar to that of cluster 4 above. Both comments make reference to progress and effort in obtaining high TOEIC test scores. They also remark on measured progress after reading online webpages and how efforts outside of class directly affect test results in class. The final part of comment 2 could be the most outstanding: *"In the modern business world of today English is an essential component for success."*

Both the comments in this section of the results show a high level of motivation. However, the emphasis is less on how to obtain a high score through the medium of technology but rather on just the score itself. Due to this point the location of this cluster is high on the y-axis, but about mid range on the x-axis.

4.8.1.6 Enjoyment

There were four comments contained in this area all of which commented on the self-satisfaction and enjoyment element of learning for this class. This section indicates the factor of enjoyment that students get from doing the homework with technology. These comments also suggest how satisfying students find doing the homework to be.

Table 55. Cluster 6 (Week 10) – Satisfaction and Enjoyment

Comment	Cluster 6 – **Satisfaction & Enjoyment**
1	*Yes, I do the homework because it is fun.*
2	*Yes, I do the homework because I enjoy English.*
3	*Yes, I plan to continue to learn English because I enjoy learning language and like to study English.*
4	*I realize my English has improved when I actually read English and can understand it out of class, whereas I couldn't before. This class has provided me with more contact hours and aided towards my satisfaction level of learning English.*

The above four comments all show positive signs of motivation towards English learning. All of these comments also express a conclusive fondness towards completing homework assignments for this class. Although none of these comments specifically mention technology per se, it is clear that they are implying this as almost all of the homework assignments for this class involved some form of blended learning tool. Comment 4 is of particular interest as this student mentions a level of self-satisfaction in realizing that their English reading comprehension levels have improved. Again it is not clearly stated what influence technology has had on this improvement. The position of this cluster on the affinity diagram reflects this point and is the reason why it is high on the y-axis and relatively low on the x-axis.

4.8.1.7 Effort and Self-Efficacy

In this section there were 4 comments. However, all three comments emphasize two important traits for students, self-efficacy and effort. These two student

comments show a realization that effort and how students feel about themselves are key to success in language learning. Here, the recurring point of effort and its connection to success appears.

Table 56. Cluster 7 (Week 10) – Effort and Self-Efficacy

Comment	Cluster 7 – **Effort and Self-Efficacy**
1	*Yes, I am planning on continuing to study English after taking this class. I would like to take an English class here next year, but I am not sure if I can fit it into my schedule as I already have enough English credits to graduate. I tried very hard in my English classes in the 1st and 2nd year and will be disappointed not to have any more English classes in my 3rd year. If possible I would like to take an English class again next term.*
2	*Homework is to be done individually. Basically, if you are diligent with your studies and do your homework you will improve. I believe that there is a strong connection to the effort you put in to your studies and the progress you make. If you try hard and do your best, success will prevail.*
3	*Yes, I actively do the homework for this class. The homework we are assigned is for our benefit, not for the teacher's, if we do not do it our language level will not improve.*
4	*I mostly did the homework. However, there were times when I did not.*

The position of this cluster on the affinity diagram is almost directly in the central region of the x and y-axis. This position generally indicates a motivation and a positive attitude towards technology in education although no explicit point clearly states this from these remarks.

4.8.1.8 Online Tools

This section of results all remark on specific online learning tools that were introduced in this class. Each of the 8 comments in this section all make mention of one online learning tool in particular. This section highlights the change and transformation students have made in using their smartphones for English learning. Several sites are noted here that were all previously introduced during class time, namely Quizlet, Mreader, wikispaces and Dyned. This section is highly significant

and emphasizes the changes students are showing with regards to their cell phone usage.

Several crucial points can be made from this data subset. Firstly, students have shown an improved understanding of the value their smartphones have regarding their learning when comparing similar comments in the first batch of survey data. Secondly, students have also shown a larger variation of usage than previously and not just mention of the same sole tool.

Table 57. Cluster 8 (Week 10) – Online Tools

Comment	Cluster 8 – **Online Tools**
1	*I use my smartphone to access line, youtube, facebook and occasionally to check my homework.*
2	*I use my phone to check Dyned.*
3	*I think the accessibility and convenience of having the internet at your fingertips is excellent with modern day technology. (implicit- I use my smartphone to access many online tools)*
4	*I use my smartphone for this class in several ways. I sometimes check my wiki page. I often take books quizzes on Mreader with my phone and I often use Dictionary apps to check meanings of words."*
5	*Recently I often check Mreader online.*
6	*I am now much better at using Mreader, Quizlet and wikispaces and often check them online.*
7	*My smartphone skill has not changed any since taking this class. I often use my phone to check LINE, youtube and facebook, however I check my homework with my phone everyday. (implicit – I now use my phone to check my homework, which I never did before)*
8	*Since I joined this class I now know how to download music and videos to embed into my Wikispace page. I also use my phone now to take book Quizzes on Mreader.*

Many learning tools are mentioned within the confinements of these comments. Some of these tools explicitly mentioned are: Quizlet , Mreader, Wikispaces and DynEd. All of these tools target blended learning and were introduced to the students at delayed intervals in the first 3 weeks of term. These comments also suggest that students have slowly made the transition to more adapt blended learning as they accustom themselves to the multi functional asset that is their smartphone. Previously, several comments suggested a clear distinction between

smartphone usage for personal use and that for study use. Where students formerly used their smartphones for solely private matters they are now showing a transition to use them for their studies. If this trend continues, ultimately this may be a key point in the transition from a teacher dependent learner to an independent learner.

The location of this cluster on the affinity graph clearly indicates a high regard for technology with frequent mention of various online tools, and is therefore far right, below cluster 3, on the x-axis. However, regarding the y-axis and motivation, cluster 8 is positioned in a slightly lower section. The majority of clusters are all located in this positive region of the graph.

4.8.1.9 Face to Face (F2F) Learning time

This section comprised of 4 comments all of which referred to F2F class time. All of these comments were a direct answer to question 6 of the survey;

Q6. What do you think is more valuable to your English learning, out of class study or F2F class time?

Three of the total of 4 responses gave very simple one-phrase answers with very little detail. However, it was clear from these responses that students still highly value class time.

Table 58. Cluster 10 (Week 10) – Face-to-Face (F2F) Class Time

Comment	Cluster 10 – **Face-to-Face class time**
1	*F2F*
2	*F2F*
3	*F2F*
4	*I sometimes make use of my daily commute to college by listening to English music or by reading books on my way to school. However, I still think that the most effective way to learn English is by attending class. During a 90minute lesson we can talk with the teacher, talk with friends in English, which are both very unlikely to happen outside of class. I feel that class time is still very valuable. Coming to class keeps us motivated.*

This section highlights the student perception of class time. Comments here imply that students still value class time tuition more highly than learning independently. This also implies that although students like to use technology to learn autonomously, they feel reassured to know that what they are learning outside of class is accurate by confirming their understanding in class through teacher tuition. Despite their fondness of technology in their out of class learning habits, some students still feel that F2F learning is more valuable. This implicitly expresses that students can confirm meanings of content learnt independently, in class through teacher tuition and test taking drills. Notwithstanding, this section also substantiates that students do not feel completely confident learning entirely independently and still believe that attending English lessons are imperative. Comment 4 above accentuates this very point. This student feels that during a 90 minute class the opportunities to interact with the teacher and classmates are invaluable, but above all they think that class time provides a chance to actually talk in English. This opinion culminates in the final line of this individual's comment "coming to class keeps us motivated".

4.8.1.9.1 No change

The final cluster in this data range comprised of 4 comments all of which stated that there had been no particular change in the way they learn. Although this would appear quite concerning given the area of this research such comments are inevitable. Comment one declares that this individual has not learnt anything new since the 5 weeks prior to this survey. What this suggests is that this student may have acquired several new skills in the first five weeks, but then built on these skills and accustomed themselves well thereafter. Comment 2 also vaguely implies that this student was already motivated to learn English and the input of technology may have helped, but not overly encouraged this person to learn more. Comment 3 specifically states that technology is "very useful" but also affirms "technology alone

is not enough for learning English". This student also states that F2F class time interaction is also very important. Finally, comment 4 mentions the topic of smartphones usage, but not necessarily for learning English. The slight negative stance in all four of these comments is the reason why this cluster is positioned in the negative area of both the x-axis and y-axis.

Table 59. Cluster 11 (Week 10) – No Change

Comment	Cluster 11 – **No Change**
1	*I haven't learnt anything new in the 5 weeks since the last class survey.*
2	*I don't feel that technology has motivated me more to learn English.*
3	*Technology is extremely useful, however technology alone is not enough for learning English. Most important is human F2F interaction.*
4	*I use my smartphone everyday, but not necessarily always for learning English.*

After the initial introduction of smartphone applications that would be used to reach the goals for this course, students have shown a greater comprehension of the benefits of mobile learning when comparing these results to those 5 weeks previously. Students have also shown an understanding of the opportunities that computers and technology can give to foreign language learners in Japan. Despite this overall enthusiasm for computers and technology, students still seem to value the role of the teacher and the importance of support and encouragement that is only possible during class time. More detail on the high regards to F2F teacher interaction that students have will be commented on in the Black-box section of this discussion.

4.8.2 Black-box zone:

The black box region of this data set indicates the varying factors which have influenced the student in their learning process during the period from week 5 to week 10 of this study. In continuation from week 5 the students at this stage will have had ample time to customize themselves to learning with the online educational tools that were introduced to them from week 1 to week 3. In this 5 week period,

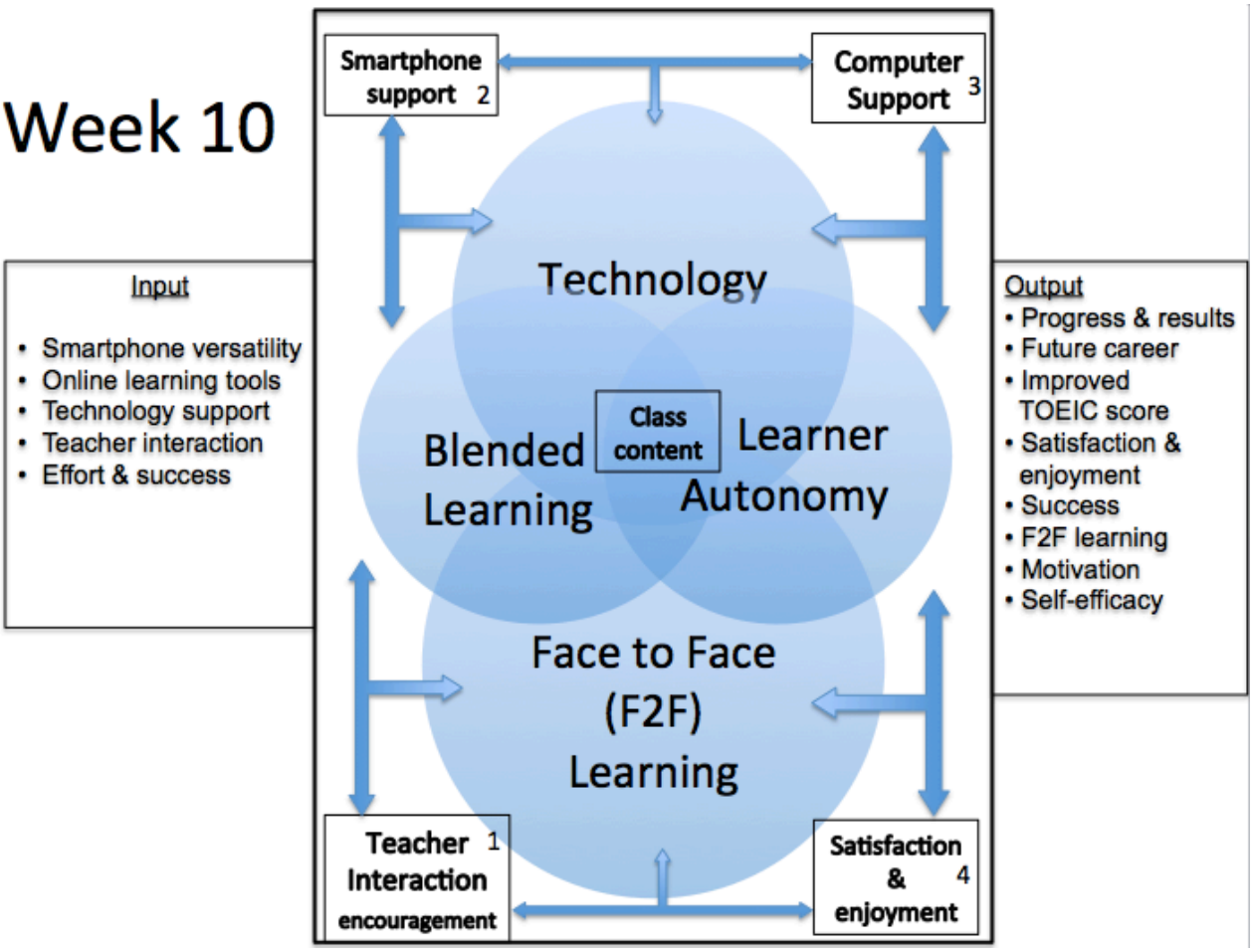
students were expected to have reached a word list goal of 200 words in Quizlet . They were also expected to have completed up to part 3 of their wiki-project and finally to have reached 70% of their goals in Mreader. All these objectives gave the students extensive use with the three major blended learning tools for this course. The instructor also gave comprehensive feedback and reminders about the contents of each blended learning goal and where time permitted, individual support and assistance during class time. Students should have been far more experienced at this stage with these tools. By now students were

Each of the three main blended learning tools had their own individual goals. For Quizlet, students were expected to add 20 new word items per week as opposed to just 10 in the previous data collection phase. The source of these words should have been from a far wider area and not just the two class textbooks. As students gradually came into contact with more text, both analogue and digital they were encouraged to add unknown words to their list at any occasion encountered. There was a reading word target which every student must also reach for this course. On reading graded reader books, students would search for the book they had read through Mreader then take a short quiz to assess their comprehension. Short quizzes comprised of 10-15 basic questions about the contents of that book. If they scored more than 60% on these quizzes they would gain the word count for that book. The Mreader system is widely used in EFL and ESL courses around the world as it is an almost fool proof way of assessing comprehension of short books. All reading and Mreader activity was performed independently, out of class.

Finally, student use of Wikispaces has also greatly increased. Students were now expected to complete up to part 4 of their wiki-project and should now be accustomed to uploading pictures, embedding videos and editing and creating wikis through this

educational tool. This sudden increase in blended learning activity, which is directly related to learner autonomy is the main reason the corresponding spheres are so much larger here. As the volume of technology that students are exposed to is so greater here (figure 2) the subsequent sphere is again much larger than in figure 1. This confirms that students have shown a remarkable improvement in the 5 weeks at this stage, but still are not completely confident at learning independently.

Figure 22. Week 10 Data Analysis for Input, Process (Black-Box) and Output



This flowchart, similar to that of the data for week 5, illustrates the pertinence of each of the four key factors related to this study. Each sphere indicates the level of influence it has on the student. The sizes of these spheres have alternated somewhat compared to those in figure 1, the data for week 5. The significance and meaning behind these changes will now be discussed.

Students still seem to hold F2F lesson time in high regard. Students also realize that time and effort spent out of class using online and smartphone tools introduced in class is essential to success. The larger size of the F2F sphere in figure 2, indicates the importance that students associate class time to their learning. In this sense the size of this sphere has not changed any in comparison to *figure 1*. Without teacher interaction, encouragement and support in class, students declare that they cannot progress. However, if enough support, encouragement and teacher interaction is provided students can learn more independently at a time and pace that suits them and make the transition to learner autonomy more smoothly.

Despite the continued high regard for F2F learning time that students have, some other compelling changes have emerged. Firstly, students have come to realize that the encouragement and guidance received during F2F class time is invaluable to their success. Not only do they value this interaction but they also receive support and feedback on all the technological aspects of the course which helps them to reach their goals independently and enhance their motivation. The box marked number 1 and number 4 both signify the relation between F2F teacher contact, interaction and the satisfaction that results. It is exactly this relationship and affiliation between class time and student and the inter dependent that can lead to a wider understanding of the merit that technology can provide.

Correspondingly, the concept of technology also has a very large influence on the students at this stage, and as such is represented with an equally large sphere. There is an excessive overlap of the technology sphere and the co-related spheres of ‘Blended-Learning’ and ‘Learner Autonomy’. The boxes marked 3 and 4 are also interlinked as in-class support is crucial to maintaining the motivation to learn autonomously.

4.8.3 Output

In the 5 weeks that has surpassed since the last data phase, students have shown remarkable progress according to their comments and this KJ analysis method. From the results received at this stage, it is clear to see that students have also shown an improved understanding of the benefits that technology, particularly mobile technology can have on their learning. The diligent students also seem to realize that the element of time and effort they put in to their digital learning is proportional to their results and grades in class. As this class is primarily a test-based course, students have also shown an understanding of the positive influence that achieving good results in the TOEIC test can have on their future goals and success. Above all though, students here show signs of satisfaction and enjoyment in their learning which the introduction of learning with technology has had on their learning. One final comment which was allocated to cluster 1 declares that: "*English has become a lot more fun and easy to study with the help of computers and technology.*" This demonstrates the priority that learning with technology in modern education should have. In this case technology has helped to garner interest and help the student to stay motivated to learn. All these attributes greatly impact the self-efficacy levels of each individual.

4.9 Week 15

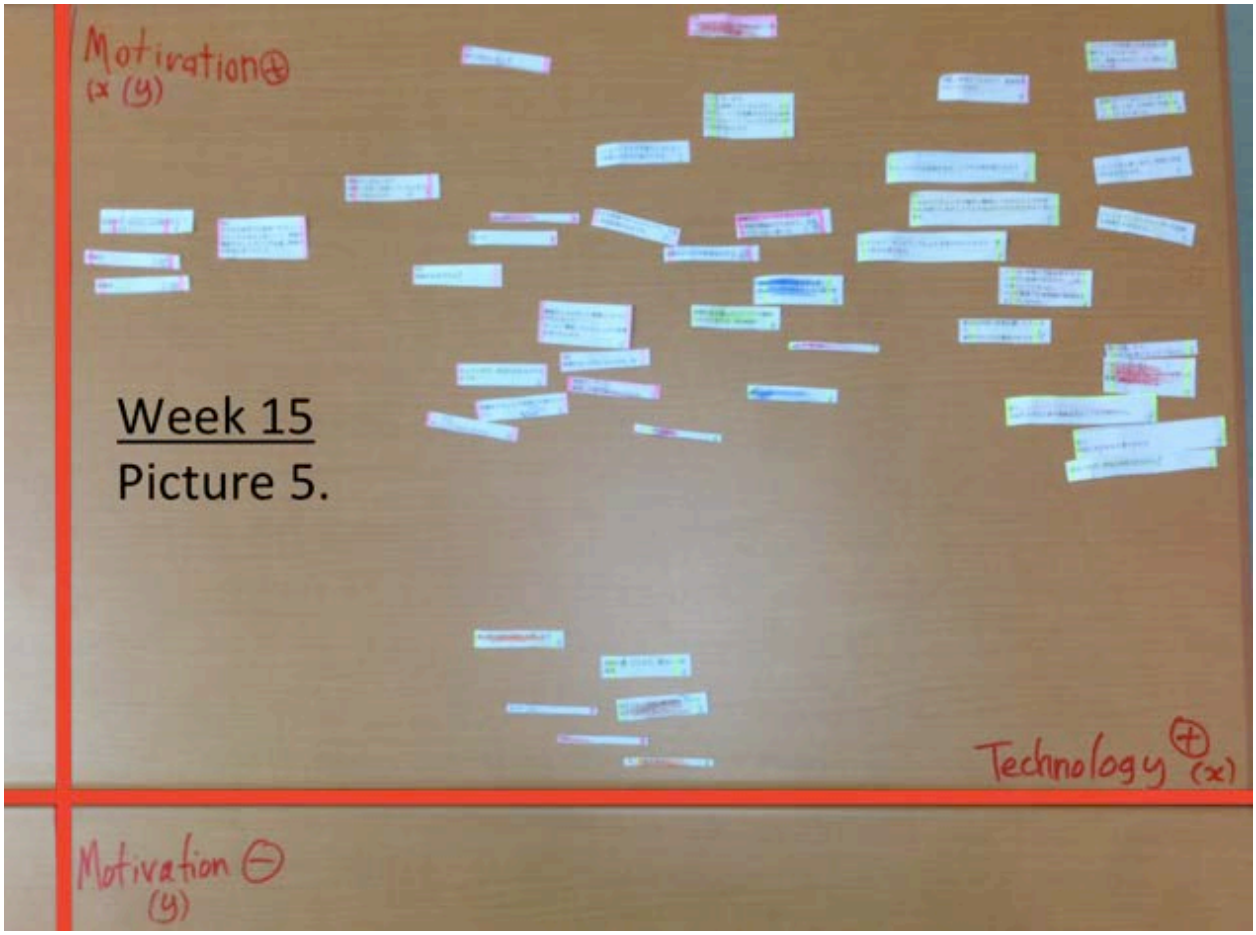
A total of 1227 Japanese characters were recorded from this phase of data collection. This averaged a total of 26 Japanese characters or 25 English words per comment. Where the Japanese answer was very short the implicit meaning was also translated, hence the similar Japanese and English word count. This was the lowest total word count of all three phases. There were two possible reasons for this substantial reduction. Unfortunately one of the subjects dropped the class and discontinued his attendance from week 11, this brought the total number of students in this study to 6. These 6 subjects were answering the exact same questions for the

third time and may have accustomed themselves from previous attempts, therefore provided only shortened replies the third time round. Finally, subjects may have felt there was little change in their roles as subjects in this study, and showed minimal variation in the process in which they reached their goals during the 5 week gap between the last data collection phase.

Table 60. Week 15 Cluster Analysis Titles

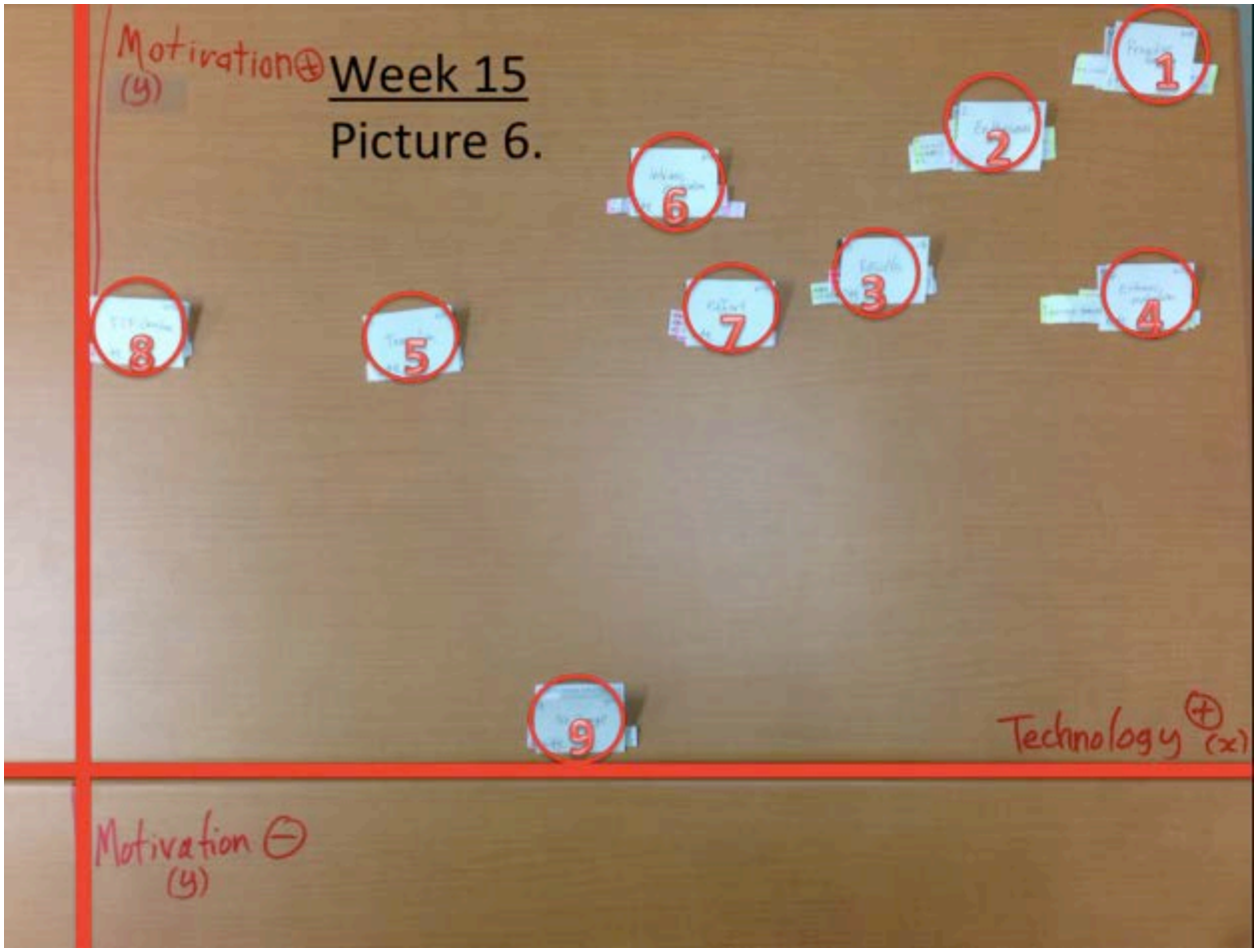
	Cluster title	Input	Black box	Output
1.	Proactive initiative		O	
2.	Enthusiasm			O
3.	Results		O	O
4.	Future learning Extrinsic motivation	O		
5.	Transition-change		O	
6.	Intrinsic Motivation	O	O	O
7.	Effort	O	O	
8.	F2F class time	O	O	
9.	No change		~~O~~	

Picture 5. Week 15 KJ Method Affinity Diagram Without Clusters



The above picture (picture 5) illustrates the initial location of each comment in this dataset. While the picture below (picture 6) shows the cluster locations for all data from the week 15 survey. There were a total of 9 cluster sets for this section.

Picture 6. Week 15 KJ Method Affinity Diagram with Cluster Locations



4.9.1.1 Proactive Learning

Comments in this section indicate a level of independence in learning that has not been shown thus far. Here there is the nuance that students have been proactive in their learning through technology. Through the several websites and web-tools introduced in class, subjects have definitely shown the initiative to use these tools to their benefit.

Table 61. Cluster 1 (week 15) – Proactive Learning

Comment	Cluster 1 – **Proactive Learning**
1	*I am far better at learning new vocabulary now through taking this class. Also, I am reading a lot more books than I ever used to.*
2	*I have added lots of English apps since taking this class. I now use these apps when I'm free to learn and review words for this class.*
3	*With modern mobile technology we can readily study or learn whenever we want. Technology helps us to stay motivated and maintain interest in English.*
4	*Using my smartphone to learn new vocabulary is the same as using a computer, but it is far more convenient. I use my phone far more now to learn new words. I use my phone for learning words when I am on the bus or train which I never did before.*
5	*Yes, I think they are very useful. Our phones are always by our side and unlike a computer we don't need to switch them on and wait for them to boot up. With our smartphones we can use them instantly and never have to wait.*
6	*I realize my English is improving during class due to all the work I have put in out of class. By learning and reviewing vocabulary on my phone and other websites out of class*

This clusters showed by far the most positive attitude towards technology. The location of this cluster is in the top right section of the affinity diagram. There is a distinct high regard for both technology and motivation towards English in these comments. Comment 1 for example declares that they are better at learning new vocabulary and read a lot more after taking this class. Another commonality between many of these comments is that they all refer at some point to studying with their smartphones, but more significantly, doing this in their own time out of class. These comments indicate a transition that students have experienced by using their smartphones to positively compliment their regular learning styles.

4.9.1.2 Enthusiasm

There were 6 comments in this section. All comments showed a similar level of motivation and perception of technology to those in cluster 1 above, although this time they were less specific.

Table 62. Cluster 2 (Week 15) – Enthusiasm

Comment	Cluster 2 – **Enthusiasm**
1	*Yes, I think technology and the internet motivates me to learn English. It is precisely because of the popularity and availability of modern technology that I am so interested and motivated when using it*
2	*Yes, I think computers and technology can help people in Japan to learn English. Computers let us instantly connect with foreign countries. If you learn how to use them efficiently they can be very beneficial at raising your language levels.*
3	*Depending on how you use technology it can be very beneficial to your learning. If you are an enthusiastic learner you should definitely be using technology to help you.*
4	*Technology can help motivate you to learn English.*
5	*Yes, I think computers and technology are very useful for learning. Technology and English are both interconnected and if used correctly they can help us to improve our English.*
6	*Computers and technology can definitely help us to learn English.*

The general positivity and enthusiasm towards learning with computers evident up to now, has continued as these comments continue the trend. Comment 2 here, suggests that "*computers let us instantly connect with foreign countries"*, while comment 3 claims that technology can be "very beneficial to your learning". Comment 5 finally professes that technology and English are interconnected entities that can definitely help each other.

The location of this cluster is similar to cluster 1, but slightly lower on the y-axis.

4.9.1.3 Results

All 7 comments in this field refer to levels of improvement of results. The lengths of comments in this pool were minimal in comparison to clusters 1 and 2 above. However, there was an overall positivity concerning attitude towards technology and motivation.

Table 63. Cluster 3 (week 15) – Results

Comment	Cluster 3 – **Results**
1	*I use my phone to listen to music and read the news every day.*
2	*Depending on how you use a computer they definitely give us the opportunity to improve our English.*
3	*I can feel my English has improved when I watch the news online.*
4	*I am much better at using the internet for self-assessment, particularly with Mreader and for checking my comprehension of English books.*
5	*Yes, I think my English has improved through out of class effort.*
6	*Yes, I think my English has improved through out of class effort.*
7	*I know my English has improved when I can understand a lot more during class.*

4.9.1.4 Future learning

There were a total of 5 comments in this section all of which made some reference to their conception of future learning. All of these comments seem to agree that technology can help learning in some way, but do not elaborate at all, and therefore were positioned high on the x-axis, but on a lower section of the y-axis, see picture 6 above.

Table 64. Cluster 4 (week 15) – Future Learning

Comment	Cluster 4 – **Future Learning**
1	*Yes, I think they are very useful. Computers and technology are the <u>future</u> of learning and it makes sense to accustom ourselves to them now.*
2	*Yes, I think computers are very useful for learning. In the <u>future</u> I think many classes will be held in computer rooms like this one.*
3	*Yes I think computers can help people learn English in Japan. Up to now, most of our English classes have been based around grammar lessons. However, learning English is not only about grammar. Through the internet we can listen to, read and see English which is very valuable.*
4	*Yes I think technology can help. In the <u>future</u>, technology will be even more prominent in our lives than it is now.*
5	*Yes I do. It makes sense to learn how to use technology efficiently now as it will become more and more available in the <u>future</u>.*

4.9.1.5 Transition

This cluster contained just 2 comments. Despite this, these two comments suggest an element of change in the way students are learning, a transition to a learning style that utilizes more technology.

Table 65. Cluster 5 (week 15) – Transition

Comment	Cluster 5 – **Transition**
1	*I am much better at using the internet now, particularly for sites such as wikispaces.com, which we used in this class.*
2	*I am better at using wikispaces, embedding videos, creating wikis or short blogs*

4.9.1.6 Motivation – Intrinsic Motivation

This section comprises of 8 comments all positively answering a combination of 3 questions (appendix 2). All comments here have affirmatively answered that they will continue their English learning after this course, that computers and technology can help learners in Japan and that blended learning in a class like this is advantageous. All of these comments show a clear preference and high motivation towards learning with computers. Although many students here agree that computers can aid English learning very few expand on this and actually site how they can help. This is the this cluster located in the mid-way point of the x-axis, but at a higher point on the y-axis.

Table 66. Cluster 6 (week 15) – Motivation

Comment	Cluster 6 – **Motivation**
1	*Yes, I am planning on continuing to learn English after this class. I would like to get a higher grade in the TOEIC test in order to improve my chances of getting a good job. I would also like to work abroad some day.*
2	*Yes, I am definitely planning on continuing my studies in English. Having a good knowledge of English will come in handy when travelling abroad.*
3	*Yes, because I like learning and speaking English. I would like to go abroad to study and travel someday.*
4	*Yes, I think doing the homework helps to improve our English. It is also necessary to get the credit for this class.*
5	*Yes, I plan to continue my studies in English after finishing this class. Although I am not very good at learning autonomously, I would prefer to do this by taking a class. Good teachers provide us with many motivational ways to study and learn that I wouldn't ordinarily know.*
6	*Yes, I think computers and technology have helped to motivate me.*
7	*Yes, I think computers and technology have helped to motivate me.*
8	Yes, I plan to continue to learn English after finishing this class because I like English.

4.9.1.7 Effort

There were 5 comments placed in this cluster. Four of these answers were a direct response to question 1 of the survey which asks if students think the homework assignments for this class are meaningful or not. Again, all four provided affirmative responses. What we can conclude from this is that students have enjoyed using their smartphones and computers to study with, not only this but they have also shown an understanding that the more time spent learning with these sources the more results will improve. This concept further complies with student understanding throughout the data phase that the more effort put in to digital learning the more benefit the student will receive. This undoubtedly positive perception of digital learning implicitly states that students enjoy doing homework in a digital format. This view is revealed by the location of this cluster, mid region on the x-axis and moderately high on the y-axis, see picture 6.

Table 67. Cluster 7 (week 15) – Effort

Comment	Cluster 7 – **Effort**
1	Yes, I eagerly completed all the homework assignments for this course each week. I enjoyed doing them and liked the contents of each one.
2	Yes, I intend to continue to study English after this course. I would like to further improve my English after finishing this class.
3	I think that it is difficult to follow the class each week without doing the homework. I diligently attend each week and am trying as hard as I can to get the best grade possible for this class.
4	Yes, I think doing the homework can be beneficial. It helps to raise our level of English.
5	Yes, I thought the homework was meaningful. I think that our English level can improve by doing homework diligently.

4.9.1.8 F2F class time

There were only 3 comments assigned to this section all of which alluded to the importance of face-to-face class time. The most remarkable outcome of this is that previously there were 6 comments allotted to this similar titled cluster in the week 10 survey data. Data for week 5 also referred to F2F teaching time far more frequently.

Inevitably though these three comments still suggest that the value of F2F time cannot be overlooked. The location for this cluster is in the neutral zone of the x-axis as there was no mention of technology while it was moderately high up the y-axis due to the positive apprehension of learning English.

Table 68. Cluster 8 (week 15) Face-to-Face Class Time

Comment	Cluster 8 – **F2F**
1	*I realize that my English has improved during class.*
2	*I think in class encouragement and teacher time is very important.*
3	*I think class time is very valuable. Class time gives us the opportunity to talk with the teacher and interact with other students, which you can't do when studying alone.*

4.9.1.9 No change

This final cluster was titled no change, in similar fashion to the final cluster of week 5 and week 10 data. There were a total of 6 comments allocated to this section all of which showed no positive sign of change since the last data collection stage. It should also be observed that none of these comments appeared pessimistic towards technology. This can explain the positive location on the x-axis with only a minimal positive location on the y-axis.

Table 69. Cluster 9 (week 15) – No Change

Comment	Cluster 9 – **No Change**
1	*My computer skills haven't really changed since taking this class. I started using Mreader to take Quizzes for books I have read which I never did before.*
2	*My computer skills haven't particularly improved since taking this class.*
3	*For the most part I thought the homework was meaningful. Sometimes though I didn't do it.*
4	*I already used my phone a lot to learn. Nothing has changed since I took this class.*
5	*My computer skills haven't particularly improved since taking this class.*
6	*I use my phone to look up English words once every few days.*

4.9.1 Input

All students at this stage have shown a far greater understanding of their roles in and out of class when compared to the previous two data collection phases of this project. These roles include the way in which they use the various online tools and apps introduced in class and how they utilise them for their individual benefit. Face to face class time and teacher guidance were two recurring themes of the input data here. Teacher guidance and F2F class time provides students with two valuable attributes. Firstly, teachers can set class test and simple assessments that test comprehension, while secondly F2F class time provides valuable opportunity to interact with the teacher and others in class. Perhaps most importantly class time allows students to realise their improvements through their efforts put in out of class. In the flow-chart below (figure. 3) the F2F sphere is still evident, but remarkably smaller in size than in figures 1 & 2 for weeks 5 and 10 respectively. This size represents a reduced reliance on the teacher, but still maintains the influence that class time has on the student.

4.9.2 Black-box Learning Process

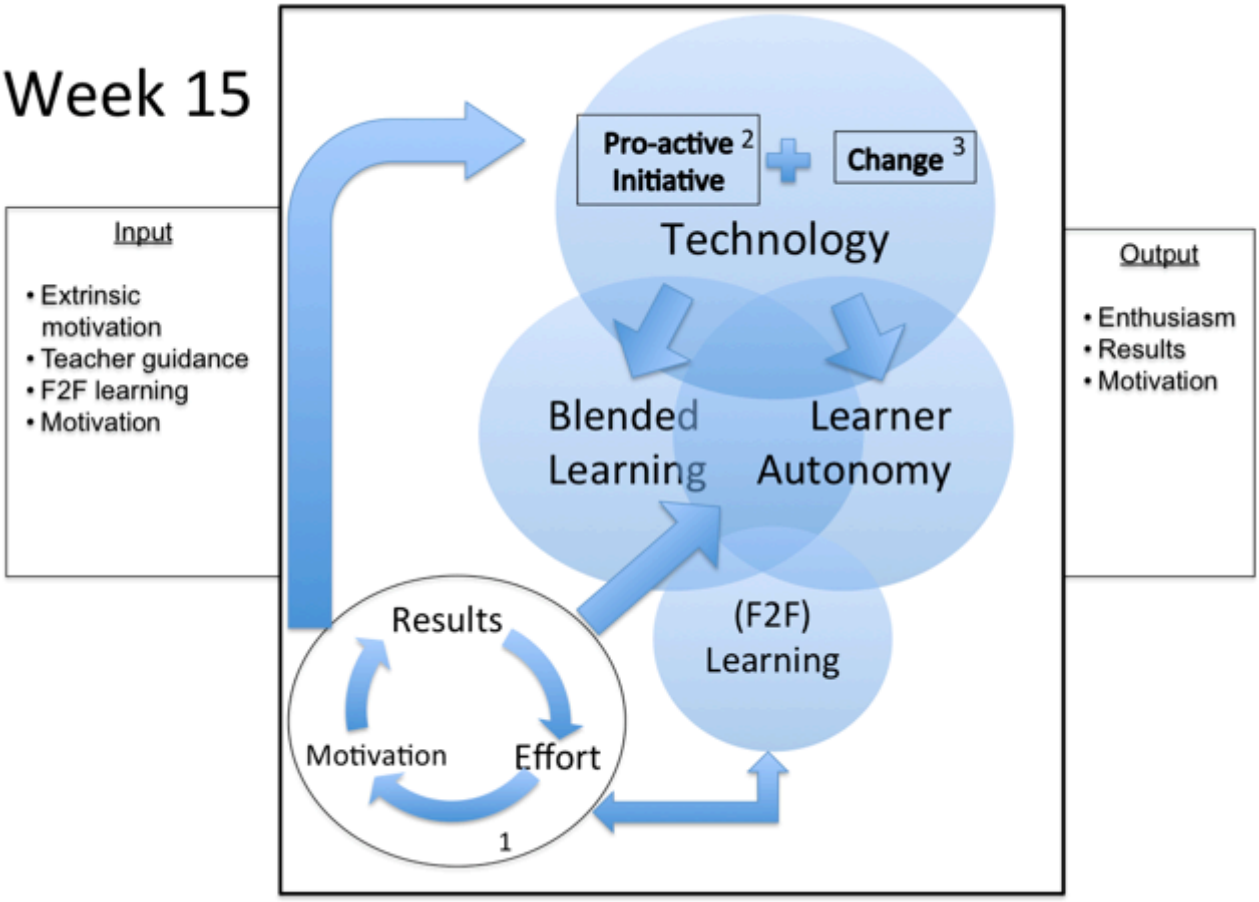
The process involved in student learning at this stage, was by far the most advanced of all stages. Overall comments received and placed in this category were extremely positive. Students seemed to show an improved understanding of the online tools introduced in class and show more initiative to use these tools effectively and independently than previously. The first cluster title was named ‘proactive learning’ and refers to students taking the initiative to use these tools for their benefit, become accustomed to them and make them a part of their regular learning routine.

Alternatively student output seems to have changed moderately from a more passive user of technology to a more active one. Several students also commented on an improvement in their score results. There are several ways this can be

interpreted. The first of which may involve in-class tests which were conducted on a weekly basis evaluating students on their comprehension of vocabulary items which arose in class. There were also short quizzes that students took assessing their comprehension of short graded readers. These tests had no influence on their final grade, but were rather an indication of overall comprehension of materials with which they had been learning. However, perhaps most importantly what could actually be concluded by these results is that students have recognized an individual overall improvement in their language skills. Closely linked to the cluster '*results'* is the continued value that students have for F2F teaching time. Comments suggest that without F2F teaching time it would be difficult to confirm an improved comprehension. F2F teaching time provides the individual with more confidence and helps to maintain motivation. There were a considerable number of comments that can confirm these findings.

Furthermore, several students mentioned how technology has changed their learning styles through this course. Although all students in this small group were well accustomed to technology in their daily routines, few of them may actually have used it for learning up to this point.

Figure 23. Flowchart for Week 15 KJ Method Data



In relation to all the comments received for these cluster groups, a flowchart was created to explain the process involved in reaching student goals within this time frame (figure 23). The alternating size of each sphere corresponds to the level of importance students have for each factor. The F2F Learning sphere is the smallest size in comparison to figures 1 & 2 respectively. Whereas, the spheres for "blended learning" and "learner autonomy" are equal size and substantially bigger. Students at the final stages of qualitative data collection have shown a much improved understanding of technology. Comments they provided, have shown a greater reference to technology than all the other three factors combined. This explains the larger size of the "technology" sphere. Surrounding the spheres are arrows which show their connection to each other and to the 6 cluster factors that each comment was placed into.

Students at this final stage seem to have adapted well to online tools and technology that they were introduced to and have shown a lesser reliance on teacher guidance and greater independence in their learning. Nonetheless, through a thorough analysis of the qualitative data, it seems that students still value class time and teacher guidance to some extent.

F2F class time provided an important opportunity for students to confirm their accuracy, by taking class tests and checking overall improvement. Teacher support and guidance provided the catalyst to allow students to verify their improvement. Without teacher guidance and F2F class time, providing meaningful interaction with other students, students could not convince themselves that all the work put in out of class was having a positive effect on their learning. The circle on the bottom left of the diagram above (figure 23) indicates that through F2F learning time, students can confirm their understanding of short comprehension tests conducted during class. Through increased efforts outside of class where students have been learning independently, results in class should improve which increases motivation and may further improve results.

This cyclical process (box no.1) stems from the transformation of student learning styles. It seems that the six students in this study have now incorporated technology into their learning regime, which explains the link between technology and blended learning. The cluster “proactive learning and change”, marked as boxes 2 and 3, both signify this change and exemplify the link they have with technology. Similarly, the blended learning component involves the use of technology at a time that suits, resulting in enhanced signs of learner autonomy.

4.9.3 Output

The output of students at this final stage of data analysis was very similar to the previous two stages although this time far more succinct. Through the progressive

use of technology students have shown an improved perception of how technology can benefit them as students of English. Firstly, students have shown greater awareness in the use of technology and learning. They have also shown an understanding of how technology will shape the future and affirm their enthusiasm for future learning endeavours. This implies that technology does motivate learners to learn, while at the same time complement their language test results.

Table 70. KJ Method Cluster Factor Comparison

Week	Input factors	Black-box factors	Output factors
5	● Teacher interaction ● Versatility of technology ● Novelty ● Smartphones ● Effort ● F2F	● Interaction ● Effort ● Scepticism ● Novelty & enjoyment ● F2F	● Technology awareness ● Results ● Globalization ● Scepticism ● TOEIC score
10	● Smartphone versatility ● Computers & technology ● Online tools ● Effort & success ● F2F Teacher interaction	● Smartphone versatility ● Satisfaction & enjoyment ● Online tools ● Teacher interaction ● F2F	● Progress & results ● Future ● TOEIC ● Satisfaction & enjoyment ● Self-efficacy ● Effort & success ● Motivation
15	● Extrinsic motivation ● Intrinsic motivation ● Effort ● F2F	● Initiative ● Results ● Change ● Intrinsic motivation ● Effort ● F2F	● Enthusiasm ● Results ● Intrinsic motivation

4.9.4 Consideration

When comparing the above KJ method for all empirical qualitative data retrieved from this research you get a table that looks like Table 41 above. This table compares all the KJ method cluster titles allocated to each of the three zones, input factors, black-box factors and output factors for each data phase. When comparing title names for input factors for all three data phases a similar pattern emerges. Firstly, in all cases students regard F2F class time as an essential part of their

learning and value the role of the teacher in providing valuable support and interaction between their fellow students. This same factor appears again in both the input and black-box zone of each of the three data phases. Coupling this with the cluster termed “effort”, which also appears regularly students’ show a realization that without effort results will not change. Up to week 5, students have shown levels of apprehension in the transformation of learning with computers and technology that they may not have been accustomed to which they appear to have been sceptical towards. However, the turning point for this initial scepticism appears to occur during the week-5 to week-10 data collection phase. During the week-10 data phase, students have shown remarkable signs of satisfaction and even enjoyment in their on-going use of the online tools and smartphone applications that were introduced to them several months previously. Most remarkable of all though are the clusters titled “intrinsic motivation” and “enthusiasm” neither of which appears before the final data phase in week 15.

Students at this point (week 15), although this may not be the case for all six students, many have shown signs of becoming pro-active learners and showing more initiative in their learning. It can be concluded at this stage that students have come to realize the influence that technology can have on their learning and the potential that it offers. Further empirical data will now be discussed to reaffirm this notion.

4.9.5 Input factors

There were a varying number of factors which influenced students choice and mindset from week 5 to week 15. Week 5 and week 10 are both quite similar in comparison showing six and then five factors respectively, whereas input factors that were deemed to influence students after just 10 weeks of this study showed a total of just 4 factors all of which were related to each other in some form.

4.9.6 Black-box factors

Similarly there appeared to be little difference in the number of factors allotted to this section of results for week 5 and week 10. However, for week 15 there was one more factor which contributed to the learning process of students during the final data phase. There were a total of 4 factors, which appeared in week 15 that were absent from the week 5 and week 10 datasets (initiative, results, change and intrinsic motivation). Perhaps the most crucial of these was initiative and intrinsic motivation. It seemed that at this stage learners in this study showed clear signs of autonomous learning behaviour and took the initiative to learn independently. This clear distinction was not evident previously and reveals a transformation in both students' learning behaviour and their perception of technology as a learning tool. Students also seem to understand the link between effort, motivation and results and may relate this cycle to the change in learning styles that they have shown over the 15-week course of this study.

4.9.7 Output factors

Unlike the pattern of similarity that emerged with the previous input and black-box, factors in the output section of results seemed to be far more varied. For week 5 there were 3 factors that did not appear elsewhere (technology awareness, globalization and scepticism). Technology awareness refers to an understanding of the new concept and indirectly an approval of its use in their English class. Likewise 'globalization' shows an understanding of the globalized affect that technology is having on the world while scepticism may refer to an element of doubt that students collectively had towards the new style of learning. In week 10 there seems to be change of opinion as generally there is a far more positive outlook of using technology to learn with. Students seem to be more motivated to learn, satisfied with improved results and contented with the progress they appear to be making.

Correspondingly, this positive trend continues for results in week 15. After 15 weeks of using the technological tools initially introduced to them students appear remarkably more enthusiastic to learn, they have shown an understanding that results will improve over time and that they appear to be more intrinsically motivated to learn that they were previously. Although the element of motivation is a reoccurring theme it is highly evident here in the final set of results during the final stages of this study.

4.9.8 Test results

A pre-test, post-test was conducted in the main-study with all students. The same test was administered for the pre-test carried out in week 1 of the course and the post-test in week 30 of the course. A TOEIC paper based test (PBT) was used for this purpose. The following table indicates the scores from both the pre and post-test for all students. Results for student number seven who left the class from week 11, are not shown.

Table 71. TOEIC Test Results for Survey 2

	Gender	**Pre-test**			**Post-test**			
		L	**R**	**T**	**L**	**R**	**T**	**D**
Student 1	F	295	275	570	460	330	790	220
Student 2	F	160	185	345	205	175	380	35
Student 3	F	225	185	410	345	250	595	185
Student 4	M	360	320	680	370	295	665	-15
Student 5	M	180	255	435	295	250	545	110
Student 6	M	135	245	380	215	220	435	55

L= Listening, R= Reading, T= Total, D= Difference
All are converted TOEIC scores. Max: 990

Of the six students here five showed higher grades over the course of this study. However, the one student (student 4) who did not show higher grades achieved a

score almost exactly the same as he had before the commencement of this course. Student 2 and student 6 showed marginally higher scores in the post-test. Although results for these students were higher, statistically their gain was not significant. On the contrary, students 1, 3 and 5 all showed substantial gains with students 1 and 3 in particular showing remarkable gains. More will be discussed on this gain in the proceeding chapter.

Chapter 5 – Conclusions of Research

Several conclusions can be drawn from this project. In accordance with the five research questions, conclusions will be drawn concerning each one.

5.1 Conclusions for research question number 1

Question 1: To what degree can technology positively enhance test scores over one academic year in a group of beginner level university students?

This study has presented a new teaching technique which can aid the student if adopted and used effectively. Results have shown that many students chose to embrace the new technique by accustoming themselves to the functions it possesses and use it to its fullest in class and independently, while others preferred to remain with techniques they were used to. The answer to the first research question is unequivocally a 'yes'. This study has shown that blended learning appears to positively enhance student test-scores and overall ability over two semesters. Results from the pre and post-test data clearly show that the group with a greater exposure to computers and online learning have shown higher improvements in a 5.8% increase than the group with less exposure which showed a 0.8% increase.

5.2 Conclusions for research question number 2

Question 2: Can the introduction of several online blended learning language tools raise awareness of technology and motivation to learn?

With regards to the second research question on whether the introduction of modern blended learning techniques utilizing technology can enrich student attitudes and benefit the student, this study has also provided many positive results. A blended learning addition to the syllabus like that shown in this study, can certainly enrich learner technique and provide an alternative contemporary way of learning. This study has provided evidence revealing that appropriate forms of online

technology can benefit students' current learning styles, enhance teacher technique and raise awareness of technology. Quantitative results in the pre-study indicate a slight rise in motivation with correlation figures for items related to this construct showing significant improvements when comparing survey 1 and survey 2. Qualitative data for the main-study shows compelling signs of improvement in this area. Students within the main-study clearly indicated positive feedback to learning with technology when their progress was closely observed over the course of this study. It must be added that during this process all subjects were closely monitored and provided with regular support both individually and as a group during class. Without this constant support these conclusions may not have been reached.

5.3 Conclusions for research question number 3

Question 3: How can a blended learning addition to a test-based course encourage autonomous learning?

All of the blended learning components introduced in this study were online tools that could be accessed anywhere students had access to an Internet connection. Some also had supplementary applications that can be updated and accessed offline and all of these tools were tried and tested on the smartphone format. As such, these tools provided increased opportunity to learn autonomously at a time that suited each individual. With regards to this, students now have more opportunity now than ever before to continue learning independently. The factor that this question is trying to answer is a latent construct and very difficult to measure. Nonetheless, results in both the pre-study and main-study have shown positive signs that the blended learning components introduced have developed learning styles in the majority of students in this study.

With the regards to the blended learning tool that was the main focus of the pre-study there were many decisive signs that were observed. Quizlet awards students

with congratulatory messages when certain tasks are complete by indicating which words are “learnt” and which are still ‘unknown’. There is also an element of competition and collaboration as students can compete with others as word tests or through one of the word games available on the interface. Students within each created class can access each other’s word lists. This appears to aid motivation as learners work collectively and collaboratively by checking their peer’s ‘known’ words and viewing their progress.

5.4 Conclusions for research question number 4

Question 4: Can teachers show an improved awareness of adopting technology in class?

Through professional development it is possible to train teachers with new ways of teaching that incorporates modern technology and utilizes the latest learning tools available. Results observed through this research would not have been possible without the communicational framework that lesson study provides.

The benefits that can yield the professional learning community by inviting in this case, students to give feedback on new teaching techniques in this way are manifold. For teachers to change their techniques and improve their teaching skills takes time and effort in any line of education. Studies like this can make change achievable, which may never have been possible otherwise by providing subjects the opportunity to give feedback and communicate openly and collaboratively. As this research has shown, this study has allowed learners to reflect on new techniques to learn from each other and develop themselves professionally.

Overall, student response to blended learning in this research was very positive. Good input, in the form of teacher reform, on-going teacher and student support of new and modern learning styles is vital in the learning process. This study has shown that input, using technology to introduce profound ways of learning can help to

maintain student motivation and overall output. This research has also shown that there will inevitably be slight antipathy towards the introduction of new teaching techniques which require time and effort to understand and use effectively (White, 2007). However, when sufficient time and effort is given, teachers can improve their teaching standards and support their students by achieving higher test-scores and ability as was clearly shown here. Encouraging teachers to collaboratively communicate on varying modern teaching techniques can not only aid the student but also improve the quality of teaching that their students receive.

5.5 Conclusions for research question number 5

Question 5: How can this study provide evidence of a change in student learning technique to influence education at the macro level?

Quizlet and the other blended learning tools introduced throughout this study have given students a plethora of opportunities to become autonomous. Through the introduction of such learning tools, learning no longer needs to be confined to the 90 minute once a week boundaries of the classroom. Quizlet had a large impact on the students of this study with many commenting on the favourable aspect that allows students to review words anywhere any time on a device they carry with them at all times. Another encouraging conclusion that can be made was the fun aspect of learning with technology. The majority of students involved in this study were not accustomed to learning in this way, particularly when instructed to use their cell phone for learning. Up to this point students may not have made the transition to use their personal smartphone as a learning tool and may solely have used it as a communication device between friends and family. The potential here for future learning is huge and if instructed to use similar tools in the future the opportunity to continue this is endless. Technology will continue to evolve, especially in the field of science and education and provide more valuable opportunity to widen the constructs

of learning. However, further studies in the field would need to be conducted to prove that any learning styles that developed have been maintained and comprehension has further improved.

It is very easy to measure improvement at the micro and meso-level, but more difficult to do so at the macro-level. However, what this study has shown is that through a well designed and implemented blended learning course that provides constant learning support, students can greatly widen the scope of their learning. What was previously an activity confined to the classroom, with technology, students can now learn where they choose to as long as they have their smartphone device. Whether learners actually choose to and actively continue to learn new ways of learning in this way is difficult to measure, but awareness has been risen and students now know that they can learn in this new innovative way. Contemporary society will continue to evolve and adopt technology if students, teachers and educational institutions embrace this trend. Who knows what the future holds, one thing though is certain the future of education and technology is bright.

5.7 *Complications and disputes*

Although the overall feedback received from this study was positive there were several issues that arose. One such issue involves the computer literacy of the students involved in this course. The use of emerging technologies (White, 2007) can aid the tech-savvy learner, but may be too much for some of the computer illiterate students. Despite the high-tech image that Japan has, the educational system falls way behind international standards in terms of education on technology knowhow. One reference retrieved for this study states that despite the younger generation of Japan having the most up-to-date mobile technologies available, many students in Japan lack basic computer skills (Lockley, 2011) due to the absence of

computer training at the high school level. This may hinder the transition to university where many institutions are fully equipped with cutting edge technology, which students and teachers are expected to use in the classroom.

5.8 Limitations and Future Research

All good research has its limitations, this lesson study is no exception. The outcomes of this study would have possibly provided more succinct results if both groups were of equal size. Results may also have been more conclusive if there was a clear distinction between a control and an experiment group. As was previously mentioned, the initial intentions of this study were to follow this rule, however the institutional board of ethics advised against this due to the unethical favoured learning methods of one group that this would have benefitted. In regards to this point, current literature does not favour a comparative study of this nature which may benefit one group and not the other. Despite this imbalance, results have been relatively positive.

The objective of this study was to determine if blended learning can raise awareness of technology, not to improve fluency in the foreign language. The focus of this course was not on spoken ability or any one of the four skills in particular but on the general comprehension of English in a foreign language setting in Japan. Further studies would be required to determine if learning styles that were developed herein can aid comprehension at the sentence level and the practical level without simply focusing on test results. It would be interesting to see how the blended learning element of this study has influenced these students and if they have become more proficient speakers in a foreign language. It would be difficult in Japan to measure these factors, notwithstanding if the students involved in this study were interviewed again a year or two subsequent to this research to realize any levels of

autonomy reached then perhaps the attributes that technology can provide could be confirmed.

Chapter 6 – References

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Appendices

Appendix 1. Survey items for ‘Survey 1’

Pre and Post-survey Items Used for Quantitative Data Collection

F1

(9) I took this class to learn English.

(10) I took this class to improve my test score

(11) I took this class because I like English

(12) I study English a lot each week

(13) I am interested in learning English

(14) I think I have the right attitude to learning English

(15) I think the way I learn English is effective

(16) I enjoy doing the homework for this class

(17) In my free time I actively try to learn English independently

(18) I prefer to learn alone

(19) I think it is better to learn collaboratively with friends than to learn alone

(20) I think we can learn more if we share what we learn.

(21) I think we can get better at English if we only come to English class and do the homework.

(22) I think we can get better at English if we learn in class and independently in our own time.

F2

(23) I think computers help us to learn.

(24) I am good at using computers?

F3

(31) I listen to music to learn English.

(32) I watch YouTube videos to learn English.

(33) Computers and technology can benefit English learning.

(34) I enjoy studying with computers.

(35) I use my computer to study English.

(36) I think e-learning is an effective way to learn English.

F4

(42) I think using the Internet and computers helps to improve my English skills.

(43) I think using smartphone applications are effective for learning English.

(44) I think using computers in a TOEIC class is beneficial.

(45) I think learning with technology can be effective for all levels of English learners

(46) I think Teachers should teach with technology as much as possible where necessary

(47) I think learning with computers and technology can be effective in learning a foreign language

F5

(48) I will continue learning English even after university

(49) I think learning English is important for me

(50) I would rate my level of effort and preparation for this class as excellent.

(51) Do you think Quizlet is a useful learning tool? If so, why?

Appendix 2.

Survey items for ‘Survey 2’

Q1. この授業のために宿題をすることは、有意義だと思いますか？　それはなぜですか？

Do you think the completion of homework for this class is meaningful? If so, why?

Q2. この授業を履修する以前はできなくて、履修してからできるようになったコンピュータの使い方・スキルには、どんなものがありますか？

What computer skills have you gained since taking this class?

Q3. この授業を履修してスマートフォンをどのくらい使えるようになりましたか？　何の目的で使いますか？　どの程度の頻度で使いますか？

How have you used your smartphone to learn for this course so far?

How often do you use it? How long did you use it? And what did you do?

Q4. コンピュータ等のテクノロジーを使って英語を学ぶことは、いいことだと思いますか？　なぜですか？

Do you think computers and technology are useful for learning English? Why?

Q5. あなたの英語の学びは、どんな時に、特に効果が上がっていると思いますか？　授業中ですか、授業後のスマートフォンなどを使っている時ですか？

Do you think your English is getting better through the effort put in to work out of class or in class?

Q6. 日本人にとって、テクノロジーは英語を学ぶことに役立つものだと思いますか？ それはなぜですか？

How do you think technology can help people learn English in Japan?

Q7. インターネットやテクノロジーを使って英語を学んだことで、進んで英語を学びたいと思うようになりましたか？

Do you think using technology and the internet motivates you to learn English?

Q8. この授業の履修後も、英語の学習を継続したいと思いますか？　それはなぜですか？

Do you think you will continue to learn English after finishing this class? Why?